THE IRON TRADE REVIEW

VOLUME XXXVI CLEVELAND, OHIO, JUNE 4, 1903 NUMBER 23

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

A quiet week in iron and steel has followed the United States Steel Corporation's purchase of all the Bessemer pig iron offered by merchant furnaces on a basis of $18.50 at furnace. Whatever activity in foundry iron might have come from this impulse was lost in view of the pending meeting of the associated Southern furnaces at Birmingham. A two days' conference ended on Tuesday with the announcement that the following new prices had been agreed upon, being a reduction of $2.50 from the schedule promulgated April 1: No. 1 foundry, Birmingham, $15.50; No. 2 foundry, $15; No. 3 foundry, $14.50; No. 4 foundry, $14; gray forge, $13.75; mottled, $13.50; white, $13. The $1 differential was abolished and Eastern and Western markets are now on the same basis. The furnaces represented were those of the Tennessee Coal, Iron & Railroad Co., Sloss-Sheffield Steel & Iron Co., Alabama Consolidated Coal & Iron Co., Virginia Iron, Coal & Coke Co., Republic Iron & Steel Co., Roane Iron Co., Citico Furnace Co., Lacey-Buek Iron Co., and Chattanooga Furnace Co. The fact that so-called independent Southern furnaces in some instances have asked 50 cents to $1 above the $15 basis, recently having booked business for most of the third quarter at prices scaling down from $16.50 at Birmingham for No. 2, has evidently led association furnaces to believe that buyers must now come to them for third quarter iron. As compared with the contract prices of a year ago the new basis represents an advance of from 25 cents to 50 cents; comparing it with the contract price of last fall for iron for the first quarter of 1903 it is a reduction of $1 a ton. The continued heavy consumption of foundry iron and the full shipments under existing contracts support the expectation of a buying movement in the present month. Another consideration is that contracts for castings which have been held up awaiting lower prices for pig iron may now be placed. The labor situation has been cleared somewhat in the week, particularly at Chicago, and this may be expected to have some effect upon the foundry trade. As far as actual business is concerned, the week has been one of the dullest of the year in all lines. Some sales of Bessemer pig iron have been made, prices ranging from $19 to $19.25 at furnace for delivery in the third quarter and Eastern basic iron has sold in good sized lots at $18.50 at furnace. The rate at which pig iron is now being consumed, and the rate at which it is being contracted for by steel companies, indicates that steel plants will be fully operated for the balance of the year. The steel market gives evidence of continued scarcity of billets and sheet bars, with no sign that this condition will be altered this side of next year. Central Western mill prices are from $29.50 to $30 at mill for Bessemer, but very little steel is offering. One conspicuous sale was of 10,000 tons of billets by a Central Western mill, delivery extending over the second half. Steel rail mills are pressed for deliveries and considerable new business could be had if desired deliveries could be made. A sale of 5,000 tons by the single Southern producer has been made for early shipment at $31 at mill. The discussion of prices for next year has not been formally taken up, but business has been offered, and present indications are that $28 will be continued. Crop prospects still point to good buying by agricultural machinery manufacturers. Chicago reports a sale of 4,000 tons of steel bars, but there is no general covering as yet. The bar iron situation is unchanged, but the continuance of close competition is indicated. Some Southwestern Ohio business which Ohio and Indiana mills vigorously competed for brought out a price of 1.65c at Indiana mill. The tin plate trade is in excellent shape and heavy production in the next three months is assured.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, June 3.

The market presents the curious spectacle of consumers of steel-making pig asking furnaces to anticipate shipments, and buying small lots for prompt delivery, yet refraining from contracting any distance ahead, although no one seriously questions that the market price on these grades of iron has been thoroughly established for several months, if not clear through the year.

Much interest is manifested here in the meeting in Birmingham of the Southern Furnace Association. It is generally charged that much of the present uncertainty in the general situation is due to the original action on the part of certain Southern furnaces, and partly to circumstances over which they had no control. Leading Southern furnaces found themselves in the spring very badly oversold, partly because they had sold more than their theoretical make, and partly because for months they had not approached this make. Foundry grades had in this period to stand all the decrease on account of labor and other troubles, production of basic being kept up by design, and forge by the irregular working of furnaces producing off iron. Thus in the latter part of March one leading Southern interest found itself with some 30,000 tons of forge in its yards, all of which has since been worked off, largely in this district. When normal production of foundry iron was resumed in the South, shipments were rushed forward to consumers, who had been compelled to eke out their previous shortage by spot purchases, and who have lately found themselves with a larger tonnage than they could use. This has led to forced resales, and to an entire refusal to make further contracts. One can scarcely doubt that the effect of purchases of spot to take the place of iron due on contracts has been cumulative. One furnace failing to ship iron on time caused a foundry to buy from another furnace, at a higher price than that of the second furnace's contract iron, which delayed its contract shipments and forced some other foundry to buy spot iron from another furnace, which in turn delayed its own shipments on contract, so that a pretty general condition was brought about of foundries buying spot iron at fancy figures, when they were entitled to iron on contract at lower prices, and furnaces selling spot iron when their duty was rather to fill their older contracts. A further, though minor, complication arose in the North, where some East-

ern furnaces contracted for coke at high prices, reserving the right, or being bound, to furnish pig in return. Quite a tonnage of such pig has in the past two months been dumped in this market. Altogether the surprise should not be that the market has gone off, but that it has not declined more than it has, irrespective of the fact that prices, particularly of foundry grades, have been entirely too high for a healthy market.

The expectation is that the Southern furnaces will name a price of $15 f. o. b. Birmingham, for No. 2 foundry, which would shut off importations except for drawback purposes, and speculative lots already contracted for. There is a very strong suspicion that the foreign iron recently sold and offered in the East has really been speculative iron, the sellers from prudential reasons concealing this fact. It is extremely doubtful if the present market would let in a ton of foreign iron at existing prices of foreign producers, except for drawback purposes, and this is not a large item.

All through finished steel lines the market is entirely sound, and in a perfectly healthy condition. In all lines mills are in receipt of orders and specifications enough to keep them running to full capacity, and in some lines, notably rails, they are uncomfortably behind.

There is some danger of a renewal of the freight congestion within the next two or three months. Although the burden of ore shipments has not so far been heavy on the railroads, there is quite a scarcity of empties at lower lake ports, and here and there are cases of serious delays in movement of finished steel products. As the total ore movement this year has been estimated from a tonnage equal to last year's up to a total 10 percent greater, this will call for heavy shipments in the later months of the season, and there is some doubt whether the railroads will be equal to it. A number of furnaces are stocking coke, partly in anticipation of such a development, and partly because they can pick up spot lots here and there at enough below the contract market to pay for the expense of stocking. There have been many holders of coke on cars who were forced to give shipping directions, and had to sacrifice the coke. This business is now nearly over.

Pig Iron.—Although prices of steel-making pig may be regarded as thoroughly settled since the steel corporation purchases, there is very little buying ahead. The corporation will take an enormous amount of pig iron in the next four months, probably 175,000 tons, this including the recent purchases and iron on old contracts, as mentioned last week. The corporation now has overdue something like 75,000 tons of pig iron, of which say two-thirds is from the association and one-third from outside producers. This puts the furnaces in excellent shape on steel-making pig to October, and there is no uneasiness or effort to induce consumers to buy. The latter are asking producers to anticipate shipments wherever possible, and are buying small lots of prompt, the movement in the past week being about 15,000 tons of Bessemer and basic in this district, at prices ranging from $19.35 to $19.50 at Valley furnace. We hear of no sales of straight third quarter Bessemer, on which the furnaces quote about $19.25, and it is barely possible $19 could be done, or $19.85, Pittsburg. In foundry iron there is no regular buying. Furnaces quote $20.50 to $21, Pittsburg, for round lots of Northern No. 2. However, there has been a fair tonnage of iron resold at $19.75 to $20, and the latter figure can still be done. Foundries are pretty well covered through the third quarter, with delayed iron, and the expectation is the market will work down to between $19 and $20 before there is any large buying. Forge is held at $19.75 to $20, Pittsburg, by furnaces, but they will probably shade this whenever consumers show they are really ready to buy. We revise prices as follows:

Bessemer, Valley	$19 00 to 19 50
Bessemer, Pittsburg	19 85 to 20 35
No. 1 Foundry	20 75 to 21 50
No. 2 Foundry	20 00 to 21 00
Gray Forge, Pittsburg	19 75 to 20 00
Chilled Basic, Valley	19 15 to 19 50
Chilled Basic, Pittsburg	20 00 to 20 35

Steel.—There is very little doing in crude steel, even prompt business having fallen off. There are some signs of consumers buying for third quarter, but absolutely no interest in deliveries beyond September. Steel works are using up their steel themselves, and there is no offering of consquence. We quote Bessemer billets at $30.50 to $31, Pittsburg, or $29.50 to $30 at mill, with open-hearth billets at about the same figure. Sheet bars are not quoted. Wire rods are quoted $37 to $38, but there is now very little business done in this line, rods being only sold for specialties. All producers of rods make wire, and prefer to keep the business with themselves.

Ferro-Manganese.—We quote English 80 percent ferro at $50 in large lots and $52.50 in small lots, delivered. German is higher than this, and there is no domestic offered.

Muck Bar.—The market is waiting, mills meanwhile quoting $35, which seems to be only a nominal price.

Skelp.—There is a heavy demand for steel skelp, and the market is very firm at 2c for grooved and 2.10c to 2.15c for sheared. Iron skelp is a shade lower, and is not in great demand.

Rails and Track Material.—There has been quite a heavy movement the past week in railroad spikes, and prices are unchanged despite some weakness in iron bars. Rails are entirely sold up, and light rails are in excellent demand. We quote: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds, in carload lots, $70; less than carload lots, $40; 12 pounds, $38; 16 and 20 pounds, $36; 25 to 40 pounds, $36. Track materials: Spikes, 2.15c to 2.20c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

Plates.—Mills are in receipt of good specifications and have no difficulty in running full. Occasionally trouble is experienced regarding deliveries. Official prices rule on all except very prompt business, as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.66c at mill, Pittsburg; flange and boiler steel, 1.75c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plate 3-16 inches in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Pipes and Tubes.—Business in this line is stated by manufacturers to be entirely satisfactory. Tonnage is heavier than at this time last year, and it is all that can be done to keep up on deliveries. We quote official prices as follows, in carload lots to consumers, f. o. b. Pittsburg, plus freight according to Tube Rate Book to destination:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Wrought Iron Pipe. Black. Percent.	Wrought Iron Pipe. Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Cut 3 to 6 feet				
⅛, ¼ and ⅜ inch	63	52	60	49
½ inch	65	54	62	51
¾ to 6 inch	71	60	68	57
7 to 12 inch	65	53	61	50
Cut 6 feet and longer				
⅛, ¼ and ⅜ inch	64	53	61	50
½ inch	66	55	63	52
¾ to 6 inch	72	61	69	58
7 to 12 inch	66	54	62	51
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53
Threads only	66	56	62	52
Threads and Couplings	65	55	61	51
Double Extra Strong Plain End				
⅛ to 8 inch	59	49	55	45
Threads only	58	48	54	44
Threads and Couplings	57	47	53	43

NOTE.—Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent.
1 to 1¼ inches	45
2¼ to 5 inches	62½
1¼ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¾ to 5 inches	45½
1¼ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12¼ inches	63

Bars.—Specifications on steel bars are not heavy, as the dull season with agricultural works is approaching, but mills are not alarmed, as they use all their steel in other channels. In iron bars the situation is not cleared yet. The local producers are filled up, while lower figures are made by producers in various other sections. Occasional lots of such cut material find their way into this market, but the leading interests continue to quote the official price of 1.85c, Youngstown, or 1.89¾c, Pittsburg. We note offerings of carloads at 1.80c to 1.85c, Pittsburg. We quote prices as follows: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c, Youngstown, or 1.84¾c, Pittsburg, with freight added to point of delivery from Youngstown. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

Structural Material.—There is a good movement in shapes, consumption continuing heavy. A large amount of structural material is being used up locally, in buildings and bridges; in fact it is said that Pittsburg is doing more building than any other city of its size in the country. We quote official prices unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—A disturbing factor in the mill situation has been removed by the filling up of a producer which had been offering concessions from the established price. We now hear of no shading whatever. Mills are behind on deliveries. Stocks in both jobbers' and consumers' hands are kept down to the lowest convenient notch, and the situation appears entirely healthy. Production would be heavier if mills could get the steel. Independent mills are decidedly short, and as the Ohio plant has been switched back to rails, it is possible the leading interest may experience some inconvenience. On contracts for 500-bundle lots and over we quote regular prices as follows: No. 28, 2.75c; No. 27, 2.65c; No. 26, 2.55c; Nos. 22 and 24, 2.45c; Nos. 18 and 20, 2.35c; Nos. 14 and 16, 2.25c; Nos. 10 and 12, 2.10c to 2.15c. Galvanized: No. 16, 2.60c; No. 18, 2.85c; No. 26, 3.35c; No. 27, 3.60c; No. 28, 3.85c; No. 29, 4.35c; No. 30, 4.50c.

Tin Plate.—Conditions are remarkably strong. The sudden breaking of the drouth in Eastern canning sections brought immense quantities of peas and strawberries to canners, at extremely low figures, involving enormous consumption of cans, and other crops are expected to be very large. The leading interest is booked up tight on canning sizes to September 1, and all new purchases have to be made from other interests, at premiums. Production in the next three months is expected to break all records.

Wire and Nails.—The market continues firm without any noteworthy incident. We quote: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $2; plain wire, carload lots, $1.90; barb wire, carload lots, $2.30; staples, carload lots, $2.20. Galvanizing, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $2.15, and less than carload lots, $2.20, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2.25 in carload lots and $2.30 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—There is nothing new in this line, prices being firm, with a fair amount of business going. We quote: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots; tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Tool steel is quoted 7 cents and upwards, according to the grade.

Spelter.—Spot spelter seems scarcer than ever, while later delivery is unchanged, and we quote spot at 5.73½c, Pittsburg, and July at 5.53½c.

Old Material.—It is still a waiting market. No one is ready to buy, being content to take what is coming on contracts. Meanwhile quotations are simply the asking prices of dealers, which show declines of from $1 to $2 from the high point of this year, but which will doubtless be reduced further before there is any large buying. We note a lot of new melting stock, held at $21.25, which has not yet been disposed of. On ordinary melting stock about $20.50 is asked, but $20 could doubtless be done. No. 1 cast scrap is quoted at $20, but this is purely nominal, dealers having contracts yet to complete, which would suffer if they openly quoted lower prices. A recent sale of cast scrap by a railroad was at $19.25.

Coke.—We still note an occasional sale of spot coke at under $3, and it is possible that $2.75 has been shaded, but this coke is being all worked off, and the market on contract is $3 to $3.25 for second half, with no contracts being made. The movement is about satisfactory, but by no means too good. Foundry coke of good grades is $4 for prompt. Production in the Upper Connellsville region in the week ended May 23 was estimated at 250,800 tons, and in the lower Connellsville region at 53,800 tons, a total of 304,600 tons, a gain of 500 tons over the previous week, which in turn had been a gain of 1,000 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, June 2.

This is essentially a waiting market, and there are no new developments. Buyers continue the hand-to-mouth policy in covering for their requirements, and are purchasing only in small lots for immediate shipment. This is as true of several forms of finished material as of pig iron and coke. A greater interest is possibly shown in the market by melters of pig iron since the purchases of the United States Steel Corporation, but the announcement that the Southern Furnace Association is holding another meeting this week has served to offset the influence this might have had on the buying movement. Both buyers and sellers in this market expect a radical cut in prices as a result of this meeting, especially as it is known that foreign furnaces have lowered their prices to meet American quotations and are again making offers to Western consumers. A noteworthy feature in the past week is the heavy demand for billets and wire rods, one sale of 10,000 tons of Bessemer billets having been made by a Central Western mill for delivery in the last half. Steel bars have also been moving a little more briskly than for some time past, several contracts being placed for yearly requirements. Building and agricultural material are quiet as a result of the unsatisfactory labor situation, and specifications of both have been low during the week. Scrap iron continues weak, dealers being the only buyers.

Pig Iron.—Foundrymen in this section are now waiting to learn what action the Southern Furnace Association will take on prices for the last half, at its meeting this week. Since the announcement of the purchases of the steel corporation, a heavy inquiry has come from all parts of the country, melters showing themselves keenly alive to the situation. All the large consumers have been figuring with the furnaces for some time and several are reported to be ready to place their orders, providing the association makes the price low enough. If this is done, there may be a rush to cover, as an army of small buyers is ready to contract, merely waiting to see what move the larger concerns take. Some sellers look for a buying movement about the middle of the month. There have been few transactions in the week, foundrymen apparently not caring to make even small purchases when so close to the eve of a buying movement. A local mill bought 1,000 tons of

gray forge for immediate delivery, divided evenly between Northern and Southern furnaces, and a sale of 3,000 tons of a special grade was made by a Northern stack for shipment in the last half. Independent furnaces are still selling iron on the basis of $15.50, Birmingham, for No. 2 foundry, but the few sales made were restricted to carload lots. Jackson County Silvery, 6 percent to 8 percent silicon, has been in demand, and sales made at $27.30, Chicago. There has been considerable inquiry also for malleable Bessemer, but little buying, though prices are 50 cents a ton lower. Our quotations are as follows:

Lake Superior charcoal	$24 00 to 25 00
Local Coke Foundry No. 1	21 50 to 22 00
Local Coke Foundry No. 2	21 00 to 21 50
Local Coke Foundry No. 3	20 50 to 21 00
Local Scotch Foundry No. 1	21 50 to 22 00
Southern Coke No. 1	20 35 to 22 35
Southern Coke No. 2	19 85 to 21 85
Southern Coke No. 3	19 35 to 21 35
Southern Coke No. 4	18 85 to 20 85
Southern No. 1 soft	20 35 to 22 35
Southern No. 2 soft	19 85 to 21 85
Southern Gray Forge	19 85 to 20 35
Southern Silveries (4% to 5% silicon)	22 85 to 23 85
Southern Silveries (5% to 6% silicon)	23 35 to 24 35
Jackson Co. Silveries (6% to 8% silicon)	27 30 to 27 80
Ohio Strong Softeners	24 00 to 24 50
Alabama and Georgia Car Wheel	28 35 to 29 35
Malleable Bessemer	21 00 to 21 50
Basic iron	22 35 to 22 85

Bars.—There is no change in the bar iron situation, new business and specifications being light. Some improvement is noted in the demand for steel, one transaction being a supplementary order for 4,000 tons. Prices are firm. We quote mill shipments, Chicago delivery, as follows: Bessemer steel, 1.76½c; angles, less than 3x3, 1.86½c base; hoops, in lots of 250 tons and greater, 2.06½c; less than this amount, 2.16½c; iron, 1.75c to 1.80c. Quotations from store are as follows: Steel, 2c to 2.10c; iron, 2.10c to 2.15c; hoops, 2.40c to 2.50c; angles, 2.25c rates.

Sheets.—The trade appears to be in better condition, and with the settlement of the metal workers' demands, buying has been more active. Mills are well filled with orders and deliveries prompt. Prices are firm. We quote mill shipments, carload lots, Chicago delivery, as follows: Black sheets, No. 27, 2.86½c; No. 28, 2.96½c. Galvanized, 75 and 5 percent. On lots from store, we quote No. 27 black, 2.95c to 3c; No. 28, 3.05c to 3.10c. Galvanized, 75 and 2½ percent to 75 percent.

Structural Steel.—There has been little demand from mills during the week under review, and specifications have also fallen off. This is largely attributed to the numerous strikes among the building trades and a resumption of the past activity is expected with the adjustment of labor troubles. We quote mill prices, Chicago delivery: Beams and channels, 16 inches and under, 1.75c; 18 inches and over, 1.85c; universal plates, 1.75c; angles, 3x3 and larger, 1.75c; tees, 3x3 and larger, 1.80c; zees, 1.75c. Lots from store, 2¼c per pound.

Plates.—A quiet week is reported by mills and jobbers, though the fact that only late deliveries can be given by the former has resulted in the withdrawal of some orders from this market. We quote mill prices, Chicago delivery, as follows: Tank steel, ¼-inch and heavier, 1.75c; flange steel, 1.85c. Prices for lots from stock: Tank steel, ¼-inch and heavier, 2.15c to 2.25c; 3-16, 2.25c to 2.35c; No. 8, 2.30c to 2.40c; No. 10, 2.35c to 2.45c; flange steel, 2.40c to 2.50c.

Rails and Track Supplies.—There is no diminution in the demand for light rails, and mills have booked a heavy tonnage. Track supplies are also active. We quote standard sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality, $27; light rails, 45 pounds, $34 to $35; 12 pounds, $39 to $40; with regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 2c to 2.10c; spikes, first quality, 2.25c (out of store, carload lots, 2.35c to 2.45c rates); second quality, 2.10c; track bolts, 3½x¾, with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3.05c to 3.15c, with usual differentials for other sizes.

Merchant Steel.—There has been some contracting done during the week by implement manufacturers covering their yearly requirements, but the total tonnage is not large. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.30c to 2.40c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 and 10 percent higher; cold rolled shafting, carload lots, 47 percent off; less than carload lots, 42 percent off.

Merchant Pipe.—Demand continues very heavy for all sizes of pipe, and mills are sold several weeks ahead. We quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ⅜ in. inclusive	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	71.85	61.85
7 to 12 inches, inclusive	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—There is no change, the trade being active buyers in this market. Our quotations below are on carload lots, mill shipments, f. o. b. Chicago. On less than carload lots, 12½ percent is to be added:

	L. W. Steel Percent.	C. C. Iron Percent.
1 to 1½ in.	43.35	38.35
1¾ to 2½ in.	55.85	35.85
2¾ to 5 in.	60.85	45.85
6 to 13 in.	55.85	35.85

For lots direct from warehouse stock:

	L. W. Steel Percent.	C. C. Iron Percent.
1 to 1½ in.	40	35
1¾ to 2¼ in.	50	32½
2¾ to 5 in.	57½	42½
6 to 13 in.	50	32½

Cast Iron Pipe.—A good number of small orders have been placed with mills making in the aggregate a respectable tonnage. Most of these are for quick shipment. We quote, f. o. b. Chicago, carload lots, 4-inch water pipe, $34; 6-inch, $33; 8-inch and upwards, $32; gas pipe, $1 a ton higher. On large orders these prices can be shaded.

Billets and Wire Rods.—There has been a heavy inquiry during the week for billets, a sale of 10,000 tons of Bessemer having been made by a Central Western mill to a Western consumer. An inquiry for 1,000 tons of rods from a Western wire mill is also in the market. We quote German basic Bessemer billets, $29 seaboard; domestic Bessemer billets, $32.80, Chicago; open-hearth billets for rolling mill use, $31 to $31.50; for forging purposes, $36 to $40; wire rods, $40.

Wire and Wire Nails.—All the local producers report a good demand with mills full of orders. Deliveries as a general rule are three to four weeks behind. Our quotations to jobbers, Chicago delivery, are as follows: Wire nails, carload lots, $2.20; less than carload lots, $2.30. Cut nails, steel, carload lots, $2.26½; less than carload lots, $2.36½. Plain wire, $2.10 carloads, and $2.20 in smaller lots; galvanized, carloads, $2.40; smaller lots, $2.50. Barbed wire, carloads, $2.50; less than carloads, $2.60; galvanized, carloads, $2.80; less than carloads, $2.90. Staples, carloads, $2.30; smaller lots, $2.40; galvanized, carloads, $2.60; smaller lots, $2.70. Bale ties, 85 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Coke.—There is little demand for coke, and all sorts of prices are being offered in this market. Much of this fuel is off grade and high in sulphur, which accounts for some of the low prices that are being made. The best Connellsville 72-hour coke cannot be had at less than $4 at the ovens.

Old Material.—The market is still very weak, the only buying done being by dealers short on contract stuff. Prices on several materials are lower than a week ago, the bottom not yet being reached. We quote gross tons as follows:

Old iron rails	$21 00 to 21 50
Old steel rails (mixed lengths)	16 50 to 17 00
Old steel rails (long lengths)	20 00 to 20 50

Relaying rails	29 50 to 30 00
Old wheels	20 00 to 20 50
Heavy melting steel	15 50 to 16 00
Mixed country steel	12 00 to 12 50

The following are selling prices per net ton:

No. 1 R. R. wrought	$17 00 to 17 50
No. 2 R. R. wrought	15 00 to 15 50
Shafting	16 50 to 17 00
Dealers' forge No. 1	14 50 to 15 00
No. 1 busheling and wrought pipe	12 50 to 13 00
No. 1 cast	14 00 to 14 50
Heavy cast (300 pounds and over)	10 50 to 11 00
Railway malleable	15 00 to 15 50
Country malleable	13 00 to 13 50
Iron axles	22 50 to 23 00
Steel axles	18 00 to 18 50
Cast borings	6 00 to 6 50
Mixed borings, etc	6 00 to 6 50
Wrought turnings	12 00 to 12 50
Machine shop turnings	12 00 to 12 50
Iron axle turnings	12 50 to 13 00
Steel axle turnings	12 00 to 12 50
Stove plate and light cast scrap	9 50 to 10 00
Old iron splice bars	18 00 to 18 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*, }
1064 ROSE BUILDING, June 3. }

The condition of the market this week is disappointing to those who expected a buying movement to follow the purchase of Bessemer iron by the U. S. Steel Corporation. General improvement was hoped for, but has not come. Even in Bessemer ore, for which there has been no demand, sales agents, almost without exception, say they see no indications of increased interest on the part of furnacemen, who are still inclined to postpone buying.

Freight rates for wild tonnage have settled down to 80 cents from the head of the lakes, 70 cents from Marquette and 60 cents from Escanaba. This change comes as a bitter experience to the vessel men, but there is no prospect of higher rates at any time in the near future.

Reports of shipments of ore from the upper lake ports to June 1 show that although Duluth and Superior shipped more than in 1902, the other ports fell behind and the totals, with Gladstone estimated for last month, are for the season up to June 1: 1902, 5,144,137 tons; 1903, 4,527,306 tons, or a loss of 616,831. Up to May 1 this year, the decrease was 874,677 tons compared with the same period in 1902. The shipments by ports to June 1, were: Duluth, 1,002,591 tons in 1903 and 931,155 in 1902; Marquette, 361,571 in 1903 and 515,507 in 1902; Ecanaba, 747,017 in 1903 and 1,129,825 in 1902; Ashland, 500,169 in 1903 and 712,148 in 1902; Superior, 789,259 in 1903 and 687,178 in 1902; Two Harbors, 1,111,699 in 1903 and 1,148,424 in 1902; Gladstone, 19,900 in 1902 and 15,000 (estimated) in 1903.

Coke.—Quotations on foundry coke are somewhat irregular, but have settled to a basis of about $4 for Connellsville. Sales are confined to immediate requirements and there is no difficulty in giving prompt delivery.

Pig Iron.—The large purchase of Bessemer by the corporation and the prospect of further buying by it have not stimulated the market. The fact that the furnaces which usually run on Bessemer will do so at least during the third quarter and that several furnaces which were expected to make foundry iron exclusively will be on Bessemer a part of the time shows that there will not be as much Northern foundry iron on the market as was expected, but the increased activity of Southern producers indicates that they will be a more important factor in the market than in the past. Southern iron has been sold in this territory in larger amounts than is generally known and the sales agents are more aggressive. The action of the Southern association furnaces in reducing their quotations from a basis of $17.50 for No. 2 to $15 has influenced the market for Northern irons and we have revised quotations, although sales have been so few that it is impossible to quote prices with entire accuracy. We quote as follows, f. o. b. Cleveland for the third quarter:

Bessemer	$19 00 to 20 00
No. 1 Strong Foundry	20 60 to 20 85
No. 2 Strong Foundry	19 85 to 20 35
No. 3 Foundry	19 35 to 19 60
Scotch No. 1	19 60 to 20 85
Scotch No. 2	19 85 to 20 35
Gray Forge, Valley	18 25 to 18 50
Lake Superior charcoal	24 00 to 25 00

Finished Material.—The dullness which has characterized the market for several weeks is more pronounced, especially in the jobbing trade. In spite of concessions recently made by some jobbers on structural material, the demand is not increased. This condition is attributed largely to strikes, which have stopped work on new buildings. Agreement quotations for mill sales are as follows: Beams and channels, 3 to 15 inches, 1.70c; 18 to 24 inches, 1.80c; tees, 1.75c; zees, 1.70c; angles from 3 to 6 inches, 1.70c; universal mill plates, 1.70c. Prompt deliveries are given on plates and some of the mills are not receiving enough specifications and orders to keep them busy. The price for steel bars, 1.60c for Bessemer and 1.70c for open hearth, Pittsburg, is still maintained, but very little business is being done. In bar iron, Western mills are quoting as low as 1.65c at the mill, and are able to take orders in territory, especially in southwestern Ohio, in which Youngstown and Cleveland mills have until recently sold without much difficulty, but now find it impossible to meet the prices of their Western competitors. The principal producers in this district are, however, still quoting 1.80c, Youngstown. Local mills are selling at 1.75c, Cleveland, and probably a little better than that could be done by a large buyer. Sheets are still the most satisfactory feature for the sales agents. They are in fair demand and prices are pretty well maintained. The announced prices of the principal producer for sales through jobbers are as follows: Galvanized sheets, mill sales, carload lots, Nos. 10 and 11, 2.60c; Nos. 12-14, 2.70c; Nos. 18 to 21, 3c; Nos. 22 to 24, 3.20c; Nos. 25 and 26, 3.55c; No. 27, 3.80c; No. 28, 4.05c; No. 29, 4.45c; No. 30, 4.95c. Galvanized sheets out of stock are quoted 75 and 5 off. For 3-16-inch black sheets and heavier we quote 2.15c, Cleveland. Mill sales of black sheets to consumers are made on the following basis: No. 21, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c. The following are prices out of stock. No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.60c to 2.70c; Nos. 18-20, 2.75c to 2.85c; Nos. 22-24, 2.85c to 2.95c; Nos. 25-26, 2.95c to 3.05c; No. 27, 3.05c to 3.15c; No. 28, 3.15c to 3.25c.

Old Material.—The market is lifeless and prices are tending downward, but quotations are to a considerable extent nominal. We quote f. o. b. Cleveland, gross tons:

Old iron rails	$24 00 to 25 00
Old steel rails (over 6 feet)	21 00 to 22 00
Old steel rails (6 feet and under)	20 00 to 20 50
Old car wheels	24 50 to 25 00
No. 1 R. R. wrought scrap	22 00 to 22 50
Mill scrap	19 00 to 19 50
No. 1 machine cast scrap	18 00 to 18 50
Iron axles	29 00 to 30 00
Steel axles	28 00 to 29 00
Axle turnings	17 00 to 18 00
Wrought turnings (free from cast)	16 00 to 17 00
Cast borings	10 00 to 10 50
Uncut wrought iron boilers	11 00 to 12 00
Steel boiler plates	18 00 to 19 00
Grate bars	13 00 to 14 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	12 00 to 13 00
Wrought drillings	15 50 to 16 50
Malleable iron (railroad)	19 00 to 20 00
Malleable iron (agricultural)	16 50 to 17 00
Stove plate	14 00 to 15 00
Heavy Steel	20 00 to 20 50

Joshua W. Rhodes & Co., selling agents for the Cherry Valley Iron Co., Pittsburg, have opened offices at 903-4 Citizens' Bank Building, Cleveland, with C. H. Lewis, formerly of Pittsburg, in charge.

CINCINNATI.

June 2.

Advices received here from the meeting of the association of Southern furnaces at Birmingham, indicate that the following schedule has been agreed upon for the second half of 1903:

No. 1 foundry and No. 1 soft	$15 50	Birmingham
No. 2 foundry and No. 2 soft	15 00	Birmingham
No. 3 foundry	14 50	Birmingham
No. 4 foundry	14 00	Birmingham
Gray forge	13 75	Birmingham
Mottled	13 50	Birmingham
White	13 00	Birmingham

This schedule will undoubtedly be received with much favor by the trade here. The market has practically drifted to this basis, on the little business doing, and for the past two weeks

quotations have been current at or near these prices. We have heard of nothing below the $15, Birmingham, basis and some of the furnaces, outside of the combination refused to follow the market below $16, Birmingham. It looks as though the distributors of Southern iron in this market would be willing to maintain the new schedule. This applies to representatives of independent furnaces as well as to those in the combination. This basis will put Southern iron at a slight advantage as to price in competition with Northern iron, and with no differential basis in the way, as between Eastern and Western territory, the attitude of the selling interests in general will be one of confidence. So far as conditions the past week are concerned there has been no change in the situation. Orders were for small quick shipment lots and very few of them. The market was exceedingly dull and sellers were urging nothing, in anticipation of the Birmingham meeting today. Some sales of low grade iron were reported to have been made at low prices with $13.25, Birmingham, for gray forge mentioned as having been done. The market, however, was in such a waiting position that very little business was transacted. We revise quotations in line with the reported action at Birmingham:

Southern Foundry No. 1	$18 75 to 19 25
Southern Foundry No. 2	18 25 to 18 75
Southern Foundry No. 3	17 75 to 18 25
Southern Foundry No. 4	17 25
Southern Foundry No. 1, soft	18 75 to 19 25
Southern Foundry No. 2, soft	18 25 to 18 75
Gray forge	16 75 to 17 00
Northern Foundry No. 1	20 00 to 21 00
Northern Foundry No. 2	19 25 to 20 00
Southern car wheel iron	25 75 to 26 75

Finished Material.—The market is quiet so far as large business is concerned, although there is some inquiry for round lots. We call bar iron a shade easier, with car lots quotable at 1.80c base, half extras. Steel bars remain at 1.72c base half extras, with the retail price 2c base half extras for both out of store. Galvanized sheets are being quoted at 75 and 5 percent off. We quote black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.10c; No. 27, 3.20c; No. 16, 2.65c; No. 14, 2.55c; No. 12, 2.45c; No. 10, 2.35c. Tank plates are firm and sell out of store at 2.15c for ¼-inch and 2.25c for 3-16-inch. Beams and channels are quoted at 2.15c to 2.25c from stock, and angles at 2.15c to 2.25c for base sizes.

In merchant pipe prices remain unchanged. Trade is fair but there is no large business doing. The tone of the market is steady. We quote:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	63.7	53.7
½ inch	68.7	58.7	65.7	55.7
¾ to 6 inch, inclusive	73.7	63.7	70.7	60.7
7 to 12 inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1¼ inch	41.2	35.2
1¼ to 2½ inch	54.2	34.2
2¾ to 5 inch	59.7	44.2
6 to 13 inch	54.2	34.2

Old Material.—The market is dull and is feeling the reflex of the conditions in the pig iron situation. Buyers and sellers are cautious. Dealers hesitate to buy and melters are holding off. Prices are largely nominal:

Old No. 1 railroad wrought, net tons	$16 00 to 17 00
Cast machine and foundry, net tons	14 00 to 15 00
Old iron rails, gross tons	19 00 to 20 00
Old steel rails, gross tons	17 00 to 18 00
Old short lengths, gross tons	17 00 to 18 00
Old iron axles, net tons	20 00 to 21 00
Stove plate, net tons	9 00 to 10 00
Wrought turnings, net tons	10 00 to 11 00
Cast borings, net tons	7 00 to 8 00

PHILADELPHIA.

June 2.

Business during the past week has not been very satisfactory, as there is still much uncertainty, in spite of the recent purchase by the U. S. Steel Corporation. It is understood that a new steel plant has made its first purchase of pig iron within a few days at lower figures than have been quoted. In finished lines, the market is quiet, but conditions are not entirely unfavorable.

Pig Iron.—There is little demand and prices are irregular. Buyers who could place desirable orders could get No. 2 foundry at $19.50, but they are not coming into the market. The local production is the largest ever known and furnacemen are disposed to make prices which will prevent further importations. Mills are buying only for immediate requirements. Prices are to a considerable extent nominal, but are about as follows: No. 1 X foundry, $21 to $21.50; No. 2 X foundry, $19.50 to $20.50; No. 2 plain, $19 to $19.50; gray forge, $19 to $19.50; Middlesboro No. 3, $19.50 to $20; basic, $19 to $19.50; Middlesboro in cargo lots, $16.75 to $17.

Steel.—The market is extremely quiet. Prompt deliveries command about $31, but buyers expect lower prices for the last half. German billets are selling at $28 to $29.

Finished Material.—Plates are in good demand. Structural mills are not receiving specifications as rapidly as they had expected. This is due largely to strikes, which have stopped building operations. Bar iron is weak. The general tone of the market is not strong and early improvement is not expected. We quote as follows: Plates in small lots, 1.90c to 1.95c; carload lots, ¼-inch and thicker, 1.75c to 1.80c; universals, 1.80c; flange, 2c; marine, 2.10c to 2.15c; fire box, 2.20c to 2.25c. On bars prices for carloads are usually quoted at from 1.80c to 1.85c for refined iron and 1.70c to 1.75c for steel bars. In structural material beams, angles or channels, ordinary sizes, are quoted 1.73½c to 1.80c for carload lots, with the usual addition for smaller quantities.

Old Material.—The market is very dull. Sales are few and of small size. We quote: Old steel rails, $21 to $21.50; miscellaneous heavy steel scrap, $20.25 to $20.50; low phosphorus scrap, $28 to $29; old steel axles, $26 to $26.50; old iron axles, $28 to $29; old iron rails, $24 to $24.50; old car wheels, $22 to $23; choice scrap RR. No. 1 wrought, $22 to $22.50; country scrap, $19 to $20; machinery cast, $18.50 to $19.50; No. 2 light scrap (forge), $18 to $18.50; No. 2 light scrap (ordinary), $14 to $15; wrought turnings, $16 to $16.50; wrought turnings, choice heavy, $17 to $17.50; cast borings, $10.75 to $11.25; stove plate, $15 to $15.50.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, No. 150 NASSAU ST. June 2.

Pig Iron.—The only thing which saves the market from complete stagnation is the buying of small lots to meet immediate requirements, and rarely does this buying exceed 100 tons at a time. The outcome of the meeting of Southern furnace companies at Birmingham is awaited with considerable interest, and predictions are freely made that $15 will be fixed for Southern No. 2 foundry. It is thought here that a reduction to this extent would lead to a large influx of new business, sales agents stating that foundrymen who are holding off from purchasing for extended delivery would be willing to provide for their requirements at this figure. Foreign irons are exceptionally dull. There are reports from Germany that Americans have been buyers in that market recently, but leading importers here pronounce them fabrications. Not in weeks have any new orders for foreign irons of any make been given, and such transactions as have been made in the interim have been resales, generally at liberal concessions. New York prices at tidewater are as follows: Northern No. 1, $20.50 to $21; No. 2 Northern, $19.50 to $20.50; No. 2 plain, $19 to $20; Southern, No. 1 foundry, $20.25 to $21.75; No. 2 Southern foundry, $20 to $20.75; No. 3 Southern foundry, $19.50 to $20.25; No. 4 Southern foundry, $19.25 to $19.75.

Billets.—There is no buying of German billets for immediate shipment unless the buyer is willing to pay a good sized premium. German mills are willing to contract for extended delivery at lower prices than those which now prevail. Basic Bessemer billets rule from $28 to $28.25.

Finished Iron and Steel.—All branches of the finished material market continue to be affected by labor disturbances. This is particularly true of sheets, which are very dull. Some buyers, despairing of the labor situation clearing promptly, have canceled their orders. Jobbing houses report several cases of such cancellations. Despite the unfavorable labor situation the American Bridge Co.

announces that its sales of structural material for May aggregated 101,000 tons, which is over 30,000 tons more than it booked for any month since it was organized. During the past week it received some excellent orders, among which were the following: 16,000 tons for the Wanamaker Building in New York City; 12,000 tons for the Wanamaker Building in Philadelphia; 5,000 tons for the Oliver Building in Pittsburg; and 3,500 tons for the First National Bank Building in Cincinnati. Bars are quiet, and prices are irregular. In plates a feature is the willingness of mills to take large orders for extended delivery at generous concessions. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; firebox, 2.30c to 2.50c; refined iron bars, 1.85c to 2c; soft steel bars, 1.75c to 1.85c; steel sheets, in carloads, New York, No. 28, black, 2.90c to 3c; galvanized, 75 and 2½ off.

BIRMINGHAM, ALA.

June 2.

Principal interest in the iron trade centers in the meeting of the Southern association of iron makers, to be held here today and tomorrow. There is a better tone to the market at this time, due, first, to the purchases recently made by the steel corporation; second, to the fact that several of the so-called independent furnaces are understood to have sold their output for the months of July, August and September, leaving very little iron to be had outside the associated furnaces. At the same time, present schedule prices for the West and Central West are far above the actual market. Consumers north of the Ohio river, particularly in the Chicago territory, can secure No. 2 foundry iron at prices equaling $15, Birmingham, or $2.50 below the present schedule. The logical conclusion is a reduction of schedule prices. Certain it seems that the differential of $1 per ton between Eastern and Western points will be done away with. There has been a vigorous protest against it by Western manufacturers, particularly the stove makers, who are users of large quantities of Southern iron, and who claim that with Eastern manufacturers getting the same rates on their products to the Pacific Coast trade as the Mississippi Valley makers who have to pay for a long haul on their fuel, the present differential is an unjust one. When it is considered that of the iron shipped out from this district the past twelve months, the average price obtained for probably more than 90 percent has not exceeded $13.50 at the furnace, it would appear that present prices are entirely too high to meet the views of consumers.

Coke shows a still lower tendency, notwithstanding the probable scarcity in July in view of the expected shutdown of the coal mines for ten days or longer, while a new wage scale is being arranged with the coal miners and they are taking their accustomed holiday. Prices have dropped fully $2 per ton the past 50 days, although the output at present is barely more than enough to supply the immediate home demand. Some furnaces are accumulating as large stocks as they can store, to tide them over any possible shutdown period in the coming month, but storage room at most of the furnace plants throughout the district is limited to about ten to twenty days' supply.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
Room 1909, No. 150 NASSAU ST., June 2.

Pig Tin.—Throughout the week the market showed a sagging tendency, and prices were lower, with a partial recovery today. Business is very unsatisfactory, and current reports regarding the industry from many points furnished capital for those bearishly inclined. London has been especially weak, and had not the Whitsuntide holidays set in, greater declines would have been recorded. The May statistics, compiled by Secretary Mayer of the Metal Exchange, show arrivals to have been 3,012 tons; deliveries 4,200 tons; stocks on hand 2,537 tons, and afloat 4,205 tons. Today's closings at the Metal Exchange were as follows: Spot to June, 28 to 28¼c. London closed today as follows: Spot, £125 5s; futures, £123 15s.

Copper.—The market is in an extremely unsettled condition, and prices are entirely nominal. There is absolutely no new business being booked. The London market alone furnishes all the activity in the metal, and during the week was weak. Exports of copper for May amounted to 9,182 tons. The total exports for this year up to June 1 aggregate 55,206 tons, against 81,383 tons for the same period last year. Wall street interests which have been bulling the market, chiefly on the alleged increasing demand for the metal for export purposes, will not relish these figures. Closing prices at the Metal Exchange today were as follows: Lake and electrolytic, 14¾ to 15c; casting 14½ to 14¾c. London closed today as follows: Spot, £59; futures, £57.

Lead.—Dull and unchanged here at 4.37½c, for lots of 50 tons or more. St. Louis is 4.17½c, and London, £11 10s.

Spelter.—Is quiet but strong, spot being 5.75c. St. Louis is 5.60c, and London £20 10s.

Antimony.—Cookson's is weaker at 7½c; Hallett's is 7c, and other brands at 6⅝c.

Quicksilver.—Still quoted at $47.50 per flask of 76½ pounds in lots of 100 flasks. London unchanged at £8 2s 6d.

Nickel.—Is selling at 40c to 47c for large lots down to a ton, and 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, June 2.

There is a decidedly better tone to the metal market in this city, and demand for all products has increased. Prices are firm at the following quotations: Lake copper, carload lots, Chicago delivery, 14¾ to 14⅞c; smaller quantities, 15c. Pig tin, 30c; pig lead, 4.30c in 50 to 100-ton lots, and 4.32½c in lesser quantities; spelter, 5½c in carload lots, and 5¾c to 6c in lesser quantities; sheet zinc, 6¾c; antimony, 10¾c to 11c for Cookson's, and 9¾c for Hallett's. We quote old metals as follows: Copper wire, 12¼c; heavy copper, 12c; light copper, 11½c; heavy red brass, 12c; heavy yellow brass, 9c; light brass, 8c.

Late Pittsburg News.

(Special Telegram.)

PITTSBURG, June 3.—The conference on the wage scale for sheet mills began today and will doubtless last several days. The workers ask a 15 percent advance for day hands. The manufacturers will probably ask the abolishment or the raising of the limit on output.

A meeting is in progress in New York of the heads of subsidiary companies of the Steel Corporation. Advices are that conditions in finished lines are reported uniformly good, prices firm and the mills generally behind on orders.

The Bessemer pig iron market is looking up. The steel corporation has just inquired for a little June iron. Other interests now show signs of buying for the third quarter. On this business $19 at furnace is likely. Fully 10,000 tons for earlier shipment sold the past week at $19.20 to $19.50 at furnace.

The new schedule adopted by the associated Southern furnaces will put gray forge iron in the Pittsburg market at $18.60. On this basis these furnaces may take considerable local business. If the new prices on foundry iron are adhered to it may arrest the decline in Northern foundry.

In addition to equipment previously purchased from the Westinghouse Electric & Mfg. Co., the Bishop & Babcock Co., of Cleveland, has recently installed a 175-k. w. two-phase, engine-type generator, direct connected to a Ball engine, together with an exciter and four 40-h. p. and one 20-h. p. type "C" induction motors. Geo. S. Rider & Co., of Cleveland, were the consulting engineers.

The new blast furnace of the Toledo Furnace Co., Toledo, was blown in June 1 and is working satisfactorily. A large tonnage of foundry iron to be made by this plant has been sold by Pickands, Mather & Co.

The Labor Situation.

MACHINISTS' WAGE SETTLEMENT AT CHICAGO.

CHICAGO, June 2.—The labor situation has improved considerably within the week. There is little probability of a strike among the freight handlers, several of the leading railroads having granted their men an increase in wages of 5 per cent. The Republic Iron & Steel Co., of this city, signed an agreement during the week at Detroit with the Amalgamated Association of Iron and Steel Workers for the ensuing year. The blacksmiths' helpers are still on strike, the national officers of the association having as yet been unable to induce them to return to work. A committee of the blacksmiths visited the offices of the Chicago Metal Trades Association last week and offered to settle the trouble if the association would pay the helpers 24 to 26 cents an hour. Their original demand was for 27 cents an hour. This it refused to do, telling the men to go back to work, live up to their agreement, and then open peace negotiations. The numerous other strikes in other lines of industry are in a fair way of settlement, and it is expected that within the next week business conditions in this city will have resumed their normal state.

The most important event of the week is the agreement entered into between the Chicago Metal Trades Association and the International Association of Machinists, District No. 8. Conferences between the respective committees have been in progress for several weeks, and the compact resulting therefrom is regarded by both sides as one of the most satisfactory ever made. It grants labor the right to organize, settles the nine-hour day, makes the minimum wage scale 30 cents an hour, and for die and tool makers, 35 cents an hour; provides rules for the employment of apprentices; determines when a man shall be considered a competent mechanic, and contains a clause providing for arbitration in case of future disputes. The agreement is to continue in force until May 1, 1904. It is as follows:

ARTICLE 1. The purpose and intention in drafting this agreement by the parties hereto is to bring about a harmonious feeling between the workmen employed by the Chicago Metal Trades Association and the members of said association, thereby assuring the manufacturers that they will receive a fair day's work from the machinists in their employ and that the members of the International Association of Machinists will receive a fair wage for their service while in the employ of the members of the Chicago Metal Trades Association. Freedom in the employment of labor and the right of organization shall be recognized by both parties hereto.

ART. 2. Hours. Nine (9) hours shall be the standard work day. All time over nine (9) hours in any one day shall be considered overtime, except on night shifts, when not more than fifty-four (54) hours shall be worked in the five (5) nights—viz., Monday, Tuesday, Wednesday, Thursday and Friday. If overtime is worked there will be at least thirty (30) minutes' intermission before overtime takes place.

ART. 3. Overtime. 1. Day shift. Time and one-half to be paid for all time worked over the regular day's schedule up to 12 o'clock midnight. After 12 o'clock midnight, Sundays and legal holidays—viz., New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day—to be paid at the rate of double time, except on company's own repairs to its machinery so that the factory may be in running order the following day, when time and one-half is to be paid.

2. Night shift. All overtime worked over the regular night shift schedule shall be paid for at the rate of time and one-half. In case of night shift entering holidays single time is to be paid; time worked on nights of holidays, double time.

ART. 4. Wage Scale. Men who are hereafter adjudged machinists shall be advanced, from and after May 1, by an average of 5 percent in their wage rates; such advance on machinists receiving less than 30 cents per hour to be sufficient to equal 30 cents per hour,, and on die and tool makers to equal 35 cents per hour, and further that the advance for men receiving 30 cents per hour or above shall be at least one and one-half (1½) cents per hour. The basing rates on which advance will be figured are those of Jan. 1, 1903. Thereafter during the life of this agreement the minimum rate for machinists shall be 30 cents per hour and thirty-five (35) cents for tool and die makers. Where machinists in the employ of the members of the Chicago Metal Trades Association on repair work or erecting machinery outside the shops of such members and within the limits of Cook County come in contact with craftsmen of the Chicago Building Trades Council, their pay shall be 50 cents per hour, eight (8) hours to constitute a day's work.

ART. 5. Machinists. Under this agreement the term machinist includes general, erecting, floor and vise hands, as well as any man, commonly classed as a machinist, who can with the aid of drawings prosecute the work of construction and erection of special types of machines, carrying same to a successful completion within a reasonable time. Machinists shall also include machine hands operating planers, standard plain or universal milling machines, universal gear cutters, shapers, slotters, boring mills, universal tool grinders, engine lathes, Jones & Lamson lathes, Gisholt or American turret lathes, whenever such men are required to do a general variety of work either for repairs or from drawings, and can so undertake, prosecute and complete such work to the finish required satisfactorily and within reasonable time on any of said machines. Men operating the above machines in any standard or special patterns who are required to produce duplicate and repeat pieces or jig work shall not be classed as machinists. Die sinkers, die and tool makers, shall be competent hands in their class and able to prosecute such work to a successful completion within a reasonable time.

ART. 6. Apprentices. Apprentices shall be not less than 16 years of age nor over 21 years at the beginning of their apprenticeship term, and shall be employed on the day force only, if under 21 years of age. They shall be advanced in wages from time to time and at the expiration of four years' apprenticeship shall receive at least the minimum journeymen's wage. In shops where the present number of apprentices does not exceed one for the shop, regardless of the number of machinists employed, and one to every five machinists thereafter, this proportion shall not be exceeded; where the number of apprentices is now in excess of such rate a reduction shall be effected as far as practical during the life of this agreement, provided the continued employment of apprentices now in service shall not be affected. To be recognized as an apprentice under this clause the person must be in course of training on machinist's work and must have either a regular apprenticeship contract or a definite verbal agreement as to his apprenticeship condition with his employer.

ART. 7. No Further Demands. There shall be no further demands made upon the members of the Chicago Metal Trades Association by the International Association of Machinists, District Lodge No. 8, during the life of this agreement. Under this agreement the working conditions in the shops of the members of the Chicago Metal Trades Association shall continue as they exist at the date of this agreement to the effect that no abridgment of output shall result.

ART. 8. Arbitration. Should any differences arise between the parties hereto in the interpretation of this agreement, or from any other cause, which cannot be adjusted between them, it shall be referred to a committee to consist of four (4) members, two (2) selected by each party, and if this committee cannot agree a fifth disinterested party shall be selected by the first four, who shall constitute a board of arbitration to adjust said differences, and while said differences are pending before the board of arbitration there shall be no lockout or strike, and the decision of the board of arbitration shall be final and binding on the parties hereto. In the event of any differences arising the party aggrieved shall submit its difference in writing to the other party, and if they cannot agree the question shall be submitted to arbitration as above provided for within ten (10) days from the receipt of said written statement.

ART. 9. Renewal. This agreement shall be in effect as of May 1, 1903, and so remain until May 1, 1904. Either party desiring any change in this agreement at the time of its expiration shall notify the other party in writing on or before Feb. 1, 1904, as to such change, and upon receipt of such notice by either party a conference committee of three members shall be immediately appointed to meet a like committee from the other party to jointly consider such changes. The failure to give notice of any change desired prior to Feb. 1 shall be understood as binding all parties to the terms of this agreement for the year following May 1, 1904.

THE IRON SCALE SETTLEMENT.

A satisfactory settlement was reached on the iron wage scale in Detroit last week. The main change from the one now in force is that the price of puddling, instead of advancing by 12½ cents a ton for each tenth cent advance in common iron bars beyond 1.6 cents, now advances by 25 cents for each tenth, the same as it does in the present scale from 1.3 to 1.6 cents. This makes the price corresponding to 1.7 cent bar iron $6.25 instead of $6.12½; for 1.8 cent bar iron $6.50 instead of $6.25; for 1.9 cent, $6.75 instead of $6.37½; and for 2 cent bar iron, $7 instead of $6.50. Wages for May and June are on the basis of 1.7 cents, so that if this basis continues the men will receive 12½ cents a ton advance after July 1. There is considerable question, as the market now stands, whether the 1.7 cent rate will continue, however.

A number of technical details in the scale were changed, some of these being merely to make the letter of the scale correspond to practices which have come to be recognized. Probably the most important of these minor changes is that

fomented swarth is to be paid 50 cents a ton extra. Firemen are to receive full firemen's wages from the company instead of one-half from the company and one-half from the heater. This is a protective measure to the firemen. In guide mills where heats of iron are kept in the furnace for a longer period than two hours after being ready to roll 10 percent extra is to be paid. One dollar a ton extra is paid when 10 percent of galvanized sheet scrap is worked. Men who work furnaces on heavy scrap without turnings are to receive 20 cents a ton extra.

MACHINISTS' STRIKE AT QUINCY, ILL.

For the past eight weeks the machinists in several shops at Quincy, Ill., have been on a strike, and there is no immediate prospect of a settlement. A statement of the issues involved is contained in the following circular prepared by Commissioner E. F. DuBrul, of the National Metal Trades Association, and dated at Quincy, Ill.:

"In order that the machinists and the public of Quincy may thoroughly understand the questions in dispute between the machine shop proprietors and the local Machinists' Union, a statement is submitted on the part of the employers.

"The present trouble first arose when Thomas Trinker, a machinist, was taken to Chicago under conditions which made it impossible for his employer, the Quincy Engine Works, to decide how long he might be absent. His absence interfered with the production and the force of men in the shop was therefore re-arranged and another workman, a member of the union, was assigned to do the work formerly done by Mr. Trinker.

"On Mr. Trinker's return he did not apply for his old position, and he personally has never given the company to understand that he wanted to work for it any longer in any capacity. A demand was made by his friends that he be put to work. The company replied that the re-arrangement of its force left no place for Mr. Trinker in the shop. His friends thereupon jumped to the conclusion that Mr. Trinker was discriminated against by the company merely because of his membership and prominence in the union, and this unwarranted and unfortunate conclusion has caused most of the trouble.

"Mr. Trinker's friends were told, and admit that they were told, that the company had no personal animus against this man. The company tried to show the men that aside from this, any employe had a right to quit the company's service whenever he chose, that the company had no right to compel a man to come into its employ or compel him to stay in its employ, and that on the other hand the same rights of the employer should be recognized. The company pays its money for work done, and being responsible for that work to its customers, it must in justice be conceded that the company should have full discretion as to who should be employed by it without interference on the part of anyone.

"Regarding Mr. Trinker, his friends thereupon asked if the company would put him to work to fill the first vacancy. This the company could not promise, as it had no means of knowing just when a vacancy would occur in filling which they could make use of Mr. Trinker's qualifications and ability. Several fruitless conferences with Mr. Trinker's friends resulted in nothing further than their continuing to insist in effect that the company practically owed Mr. Trinker a living.

"On Saturday, April 4, a representative of the Machinists' Union, from Chicago, after bringing up the same arguments and failing to convince the company of the duty to Mr. Trinker as his friends saw it, told the local union to strike on Monday, April 6, if the Quincy Engine Works did not put Mr. Trinker to work by 10 o'clock.

"Over Sunday a new condition arose. The company decided to propose to the men that the whole matter be left to disinterested parties to settle, agreeing to abide by the decision of such parties. The Engine Works put this proposition in the form of a letter early Monday morning, which read as follows:

"Referring to the difference existing between this company and some of its machinists, as to the employment of Mr. Thomas Trinker, we will state that we take the position that as a free American citizen any man in our employ who is not satisfied with the conditions under which we can give him employment, is at liberty to seek employment elsewhere; and we direct attention to the fact that it is customary for all men to exercise this privilege. We hold that the same sense of freedom and justice which concedes to the workmen the right to leave an employer at will concedes to the employer the right to increase or decrease the number of men in his employ to suit the conditions existing in his shop.

"Having stated our position, we wish to express our willingness to submit the matter to, and abide by the decision of, the board of arbitration or conciliation consisting of six persons, three to be chosen by those of our men who differ with us and three by this company.

"We make this concession with the understanding that pending the decision of said board, we will continue to operate our plant under the same conditions as have obtained heretofore, employing such machinists as we now have in our employ; and with the further understanding that such machinists as are now in our employ and who take issue with us on the question shall continue in our employ pending the decision.

"QUINCY ENGINE WORKS,
"Thomas Hill, President.

In reply the following was received:

"QUINCY, ILL., April 7, 1903.

"Quincy Engine Works, Quincy, Ill.

"Gentlemen: We beg to submit the following proposition: that if the firm will agree to put Thomas Trinker back to work, that all the men will return to work and agree to arbitrate the rest of the differences existing between the company and the men as was submitted to them by Mr. J. J. Keppler.

"(Signed.) R. FELKER,
J. H. IMHOFF,
E. O'FARRELL,
"Committee.

"On Monday noon, April 6, the men struck, thereby expressly rejecting the company's offer. One of the conditions stated in the Engine Works letter was that the men should continue in the company's employ pending the decision of the question at issue. The one question at issue and the one demand made and the only one, was that Mr. Trinker be put to work. If this were done there would be nothing left to arbitrate. The Quincy Engine Works has not received up to this time nor since that time any demand whatsoever from Mr. J. J. Keppler or the local union other than for Mr. Trinker's reinstatement. The company, therefore, replied as follows:

"QUINCY, ILL., April 7, 1903.

"R. Felker, J. H. Imhoff, E. O'Farrell, Committee.

"Gentlemen:—Referring to your proposition dated April 7th, we would state that as there are no other differences to our knowledge existing between this company and its machinists and as the sole question to be arbitrated is the question of the employment of Mr. Trinker, your proposition is not clear to us. Yours truly,

"QUINCY ENGINE WORKS,
"Thomas Hill, President.

"On April 8 the employes of other shops were notified by their employers that unless the union agreed to the proposition to arbitrate before Friday evening, April 10, the shops would be closed to members of the union. This action was taken for the reason that the matter had become a union matter, that it was the union which ordered the strike, and that, therefore, every member of the union became a party to the unreasonable action of refusing to arbitrate. The employers felt that the Machinists' Union of Quincy should come to its senses and show by its acts that it really was the sort of an institution it claimed and set itself up to be.

"On Saturday morning, April 11, the union in the meantime not having agreed to arbitrate, the shops were closed to union men. On Friday, April 17, a new set of demands was presented on the part of the union. The demands were in the shape of a proposed agreement and very strangely the proposed agreement contained an arbitration clause. Coming from a union that absolutely refused to arbitrate, this is peculiar to say the least.

"Another attempt to settle the matter was made on Tuesday, April 28, by representatives of the Machinists' Union, of Chicago, and of the Metal Trades Association, of Cincinnati. After considerable discussion, in order to be as fair and reasonable as possible, the employers agreed that if all strikes and lockouts were called off, all the former employes who chose to apply for work within a week would be re-employed before any new men were taken on. This was taken to include Mr. Trinker and even men who had made themselves particularly obnoxious to the Quincy Engine Works in the conduct of the negotiations and since the strike has been on—even to the

extent of taking back one of the men who had assaulted an apprentice. It was the company's firm hope and desire that such liberality on its part would be appreciated and that bygones would be by-gones and that under the new arrangements, everything would be harmonious.

"In order, however, to protect the men who remained at work or who came to work during the strike, employers insisted that no discrimination against or annoyance of such men would be tolerated, and further gave warning that a strict observance of shop rules and discipline would be enforced.

"As a further concession, for the sake of peace and to restore harmony, the employers agreed that the demands of April 17th, presented by the union, be submitted first to a conference board of six, and if such a board could reach no settlement the employers agreed to accept a board of five as requested by the representatives of the Machinists' Union. Such a board was to come to a decision on or before May 20, and its findings to date from May 1. The condition precedent to such arbitration is that matters previously in dispute be settled as outlined above. Here again the employers showed themselves more than fair.

"In the blindness of the management of the local Machinists' Union the employers' offers were rejected, the men demanding that such of the employes as had been advanced to better positions during the strike and lockout, especially in the Gardner Governor Co.'s shops, be put back to their old jobs. The Gardner Governor Co., in reply, stated that they could and would take on all of their old employes at their old wages and at once, but that they would not sell out the men who had been their friends throughout this trouble. This position was certainly fair. The earnings of the old men would not be affected, but in a spirit of revenge on the Gardner Governor Co.'s faithful employes the radicals in the local union turned down everything that the employers offered.

"Now, we ask, could any set of employers be more liberal, even to the extent of being unjust to themselves, and could any set of union leaders be more misguided and foolish even to the extent of being unjust to their own members? The employers are more than sorry that a crisis of this sort has arisen and wish to place the blame where it properly belongs, on the unreasonable local radicals who insist on flying in the face of the strong public sentiment that must and will condemn their actions throughout the whole proceedings."

LABOR UNIONS SUED FOR DAMAGES.

As a result of the strike at the plant of the Kellogg Switchboard & Supply Co., Chicago, two suits for $15,000 damages each have been filed in the superior court against the unions whose members worked for the company and against the officers of the unions. The company avers that it has been caused to lose a large amount of money by the strike. Several strikers are made defendants to the suits. One of the suits is directed against the Metal Polishers', Buffers', Platers', Brass Molders', and Brass Workers' International Union of North America, Brass Workers' Union, No. 127, and Metal Workers' Council, No. 1. The other suit is against James J. Lamb, Lee S. Fisher, R. G. Crane, J. E. Johnson, International Brotherhood of Electrical Workers, Local No. 376, International Association of Machinists, District Lodge, No. 8, Brass Workers' Union, No. 127, Brass Molders' Local, No. 83. According to H. K. Tenney, attorney for the plaintiff company, the members of the unions called on the supply company the first part of last month and asked that a contract be signed, in which it should be agreed that none but union men be employed about the plant, and that within six days every person employed should belong to the union. A further stipulation was that a sympathetic strike should not be a violation of the contract. The company refused to sign the agreement and a strike was declared May 7, nearly 700 persons leaving their work.

STRIKE BREAKING IN NEW YORK.

Encouraging progress is being made in adjusting strikes in New York City and vicinity. Officials of the Hecla Iron Works, Brooklyn, in response to the agreement reached by manufacturers who are members of the Iron League, opened their plant this week for the purpose of taking back employes desiring to return to work as individuals. As a result a large number, regardless of the unions with which they were affiliated, applied for their old places and were received as if there had been no trouble. The plant had been closed for three weeks.

Strike conditions in the building trades in New Rochelle, N. Y., indicate that the men will shortly break away from their leaders and return to work. The employers absolutely refused some of the demands, but several days ago, at the request of a number of the prominent residents, they agreed to arbitrate the whole matter. Many of the employes, some of whom were bitterly opposed to a strike in the first place, say that a settlement must be effected, or they will each make the best terms possible and return to work.

LABOR NOTES.

The American Machinery Co., of Cleveland, has petitioned the court for an injunction against the members of Machinists' Unions, Nos. 83, 233 and 238, to restrain them from interfering with the property or employes of the company. In addition to an injunction against picketing the company asks that the strikers be restrained from visiting the homes of non-union men in an effort to persuade or coerce them into striking. No order has been made as yet, the hearings in the case not being finished.

The boilermakers in every contract shop in Milwaukee went on strike June 1. They demand a nine-hour day, recognition of the union, and a minimum wage scale of $2.75 a day. Ten shops and 180 men are affected.

In connection with the recent demand of Youngstown, O., molders for a 25-cent advance in all day wages and an increase in the minimum from $2.90 to $3.15 for a nine-hour day (the latter being granted in 1901), some data have been gathered as to wages paid in other cities. At Alliance and Salem, O., where there is a 9-hour day for molders, the minimum is $2.75. Other minimum rates are as follows, all for a 10-hour day: Akron, O. $2.90; Barberton, O., $2.85; Columbus, O., $2.75; Cincinnati, $3; Cleveland, $3; Springfield, O., $2.75; Hamilton, O., $2.85; Buffalo, $2.85; Milwaukee, $3

The Smith & Wesson Works, at Springfield, Mass., resumed after being closed down two days. Three hundred and eighty-seven out of the four hundred members employed returned after signing the following pledge: "I hereby affirm that I am a member of no labor union whatsoever and agree that I will not join any such union while in the employ of the Smith & Wesson Co., without first notifying them in writing of my intention of doing so."

The machinists of Youngstown, O., have made a demand for a nine-hour day, a 15 percent increase in wages and a minimum of 33½c an hour. The manufacturers operating union shops have refused the demand on the ground that the condition of business does not warrant an increase. It is believed that a settlement will be effected without any increase in wages or change in hours.

Pressed Steel Cars Pass the 100,000 Mark.

The rapid strides made by the Pressed Steel Car Co., of Pittsburg, in the manufacture of pressed steel cars, are again emphasized by the fact that this company has made and shipped up to and including May 29, 1903, 100,467 cars. This figure represents the actual number of cars in service today manufactured by the Pressed Steel Car Co., which includes besides steel cars the wooden cars for which steel underframes have been furnished. This company, for some time past, has shipped over 120 cars a day from the McKees Rocks and Allegheny plants, using in their manufacture from 45,000 to 50,000 tons of steel plates in a month. From the present outlook, all previous records in the car building industry will be eclipsed. It is estimated that the output this year will exceed 38,000 finished cars. Large orders for cars, both wooden and steel, have been received for early delivery, in addition to a large number of pressed steel body and truck bolsters, freight car and engine tender trucks, as well as other pressed steel specialties for wooden and steel cars.

The Jones & Laughlin Steel Co. has bought from the Consolidated Gas Co. a plot 180x160 feet on the north side of Second Ave., Pittsburg, for $50,000. The property adjoins the present holdings of the Jones & Laughlin Steel Co. and will be used for extensions of its works.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON & STEEL PRESS CO.

ROSE BUILDING, CLEVELAND, OHIO.

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JOHN A. PENTON, Vice-President,
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PITTSBURG: 429 Park Building, A. O. BACKERT, Manager.
NEW YORK: 150 Nassau St., D. C. WARREN, Manager.
THE CENTRAL WEST: R. A. EVANS, Manager.

Subscription, $3.00 per annum. To Foreign Countries, $4 00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

JUNE 4, 1903

IMPORTS OF PIG IRON STILL LARGE.

The report of the Treasury Department for April shows surprisingly large imports of pig iron, there being an increase of 40,316 tons over March. Importations are said to be on old contracts, yet it is difficult to explain why iron has been coming in so much faster than in the two preceding months. The imports of steel for April were about the average for the first four months of the year. The imports of iron and steel for the first four months of 1902 and 1903 were as follows in gross tons:

	1902.		1903.	
	Pig Iron.	Steel.	Pig Iron.	Steel.
January	7,633	5,312	110,679	38,691
February	8,307	2,235	45,187	20,151
March	17,184	6,570	59,628	31,464
April	19,067	11,986	99,944	29,014
	52,191	26,103	315,438	119,320

The total imports for April were only 34,485 tons in excess of those for March, showing that the total outside of pig iron was less than for March. A notable decrease was in steel rails. The following table gives the imports for April and for the ten months ending with April:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES—GROSS TONS.

	April.		10 mos. end'g April.	
	1902.	1903.	1902.	1903.
Pig iron	19,067	99,944	95,795	845,214
Scrap	5,529	9,295	24,660	107,242
Bar iron	900	2,381	19,753	36,825
Iron and steel rails	673	11,116	3,935	104,005
Hoop, band or scroll	130	114	3,687	1,395
Steel ingots, slabs, billets or bars	11,986	29,014	30,446	322,583
Sheets and plates	560	411	7,025	6,239
Tin and terne plates	5,436	6,363	76,640	42,754
Wire rods	1,293	1,877	12,646	19,353
Wire and wire articles	465	496	3,655	2,985
Total	46,039	161,014	278,242	1,468,595

The total value of iron and steel imports for April, not including ore, but including some manufactures of iron and steel not named in the above table, is $4,643,010 against $2,379,884 for April, 1902. For the ten months, the totals are: 1903, $43,331,845; 1902, $20,280,956. Imports of iron ore were: April, 1903, 49,086 tons against 116,731 tons in April, 1902. For the ten months, the ore imports were 820,814 tons in 1903 and 944,218 tons in 1902.

The tonnage of exports given below is somewhat larger than that of the preceding month, being 32,676 against 26,624, but it falls below the exports for April, 1902. For the month, the value of exports, not including ore, but including manufactured articles not named in the table, was $8,929,233 against $9,320,633 in April last year. For the ten months this year, the amount was $79,834,953 against $82,388,463 last year and $99,228,228 in 1901. A very marked decrease is in steel rails. Increases are shown in exports of electrical and scientific apparatus, builders' hardware, pumps and pumping machinery, sewing machines, typewriters, and other lines upon which a great deal of work is done. The increase in price of locomotives is shown by the fact that, although the value of engines exported during the past ten months is reported as being $2,998,494 against $2,931,767 last year, the number exported this year was only 266 against 324 last year. The value per engine was therefore $9,048 in 1902 and $11,273 in 1903. In the case of steel wire, however, there has been a decrease in the export price, because the exports this year for ten months amounted to 81,271 tons against 79,693 tons, while the value for this year is $4,193,923 against $4,217,461 last year. A conspicuous feature of our exports in iron and steel is the way in which the exports of wire products have been, not only maintained, but increased, regardless of prices and demand in the home market. There is such a surplus of wire-making capacity in the United States as to make exports of wire and wire nails a factor that may be steadily counted on. The following table gives the exports for the articles named.

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	April.		10 mos. end'g April.	
	1902.	1903.	1902.	1903.
Pig iron	1,570	1,143	50,940	15,723
Scrap	1,220	271	11 913	5,050
Bar iron	3,857	3,560	11,160	13,517
Wire rods	1,466	5,612	8,025	27,750
Steel bars (not wire rods)	453	885	14,362	11,013
Iron rails	47	7	632	61
Steel rails	4,501	1,575	151,278	21,759
Billets, ingots and blooms	68	54	2,489	2,040
Hoop, band and scroll iron	195	356	1,412	1,415
Iron sheets and plates	314	354	3,723	2,364
Steel sheets and plates	2,072	1,070	8,600	11,350
Tin plates, terne plates and taggers' tin	92	4	685	674
Structural material	4,805	2,234	55,876	26,978
Wire	10,509	11,104	79,693	81,271
Cut nails	670	683	5,198	5,692
Wire nails	1,702	2,876	15,180	22,869
Other nails, including tacks	177	206	1,603	2,011
Total	33,698	32,676	436,886	255,585

RED CROSS PLANS FOR "FIRST AID" IN SHOPS.

In the editorial on first aid in shop accidents in *The Iron Trade Review* for April 2 it was intimated that this was a promising field for the Red Cross movement and that a more extended work along this line was then under consideration. The intimation then given is now borne out by a letter from the first aid department of the American National Red Cross, a department which will be largely educational and will be directed to the giving of instruction in the best methods of first aid treatment.

There will be two distinct branches of this work. For the first, an emergency case will be employed, similar to that in use in England, Germany and other Red Cross treaty nations. This equipment has been adapted to American needs and methods under the

supervision of the medical board of the Red Cross hospital. The case is accompanied with a series of emergency charts arranged for ready reference, giving simple and brief directions for dealing with every conceivable case of accident pending the arrival of the doctor. The plan contemplates the sale of these emergency cases at a nominal price, the profit to go to the expenses of the organization and the creation of a fund for meeting great national calamities.

The other branch of the department will undertake the formation of first aid emergency classes in every city in the country. Ambulance corps will be formed among the employes of mills, factories, railroads and industrial corporations generally, as well as among policemen and firemen. Employes will be drilled and instructed in first aid methods, and apart from the value of the knowledge they will obtain for local service, they will form an efficient force to draw from, as helpers in great national disasters. Miss Barton is sending out a circular letter from the Union Square headquarters in New York, and the above outline of what is proposed is taken from the more detailed communication of the Red Cross president. This latest effort is only in accord with the principle of the organization which counts upon the voluntary help of the people for the Government if in need, and the organized help of the people for each other in misfortune.

An impressive exhibit of the fruits of prosperity and of the wage-earner's share in them is found in a recent statement of the trust and savings banks of Chicago. On May 21 these institutions, according to official statistics, had on deposit in their savings departments $100,407,614. This is compared with $78,034,365 on May 12, 1902, an increase of more than $22,000,000. In 1893, just before the panic struck, the savings banks of Chicago had deposits of $15,800,000. The gain of the past year, amounting to about 30 percent is surprising, while in comparison with 10 years ago the ratio is 6½ to 1. Frequent repetition of the statement that wage advances have been eaten up by the higher cost of living has given it general acceptance; yet the actual citation of prevailing prices of well known articles of consumption, alongside the prices of two years and five years ago will show that wage advances give a considerable margin above commodity increments. The Chicago figures show that in spite of strikes, which have been a serious enemy of prosperity there, the money laid away by the patrons of savings banks in the past year has been one and a half times all such moneys on deposit just after the high record prosperity of 1892. It is reasonable to presume, also, that as in all times of full employment, the scale of living has been more generous, wants increasing as the means of satisfying them increased.

As they come to make new contracts with the users of castings for the year beginning July 1, foundrymen will be met with the popularly accepted notion that there has been a liberal reduction in the price of pig iron. From the famine prices that prevailed in the second half of 1902 for early delivery iron, the reduction is admittedly great—from $5 to $6, comparing the top notch prices for prompt iron with the contract basis for the second half of 1903. But the fact is that the average price of contract domestic iron shipped to foundries in the past year was less than the price foundrymen are likely to pay in the second half of 1903. Wages are generally higher than last year's; contract coke and coal are higher; and in many cases a reduction in hours of work gives a smaller tonnage, as a divisor of fixed charges. It is not an attractive outlook for the foundryman who knows what his castings cost, and who must go into competition with firms whose policy is to take the work and to give large weight to buyers' ideas of price readjustments.

OBITUARY.

Edward Winslow, connected with the Pittsburg office of Naylor & Co., died of pneumonia at Chicago, June 2, aged 26 years. He started with Naylor & Co. ten years ago and had steadily advanced, being exceptionally alert and competent, and a man of unusual popularity in trade circles. The funeral will be held on Sunday, June 7, at Brooklyn, N. Y. Mr. Winslow's parents are now on the ocean.

William Wright, one of the oldest engine builders in the United States, died May 26, at his home in Brooklyn. Mr. Wright was born in Newark, Wayne County, N. Y., May 17, 1818. When but eighteen years old he built a steam engine out of crude material so completely that a local machinist took him as an apprentice. He started engine building in Palmyra, afterward going to Rochester, where he was eminently successful as a builder of steam engines. He built some of the same in Providence, R. I., and then went with Corliss, Nightingale & Co., as superintendent, where he invented the rotative valve, which was the prime feature of the Corliss engine. He was later with Woodruff & Beach, of Hartford, Conn., and afterward organized William Wright's Engine Works, at Newburgh, N. Y., which for twenty-five years were very successful.

Joseph Warren Burden, 50 years old, died suddenly at Lennox, Mass., May 28th, as the result of a surgical operation. Mr. Burden was a native of Troy, N. Y. Soon after graduation from Williams College in 1874 he became interested in the Burden Iron Co., Troy, N. Y., with which he was connected up to the time of his death.

Henry G. Morse, of Camden, N. J., president of the New York Shipbuilding Co., was stricken with apoplexy, June 2, in the office of J. P. Morgan & Co., New York, was removed to the Astor House, and died an hour later. Mr. Morse was 55 years old. After graduating from Rensselaer Institute of Technology at Troy, he was employed for a time by the Youngstown Bridge Co., Youngstown, O.

Personal.

R. B. Mellon, vice president of the Mellon National Bank, Pittsburg, has been elected to the executive committee of the Standard Steel Car Co., and L. G. Woods has been elected treasurer to succeed A. K. Fraser.

Col. L. Cubillo, director of the Spanish Government Arsenal at Trubia, Northern Spain, who read the paper on the "Open Hearth Process," at the recent meeting of the Iron and Steel Institute, at London, has been in the United States for the purpose of making investigations with a view to considerably enlarging the capacity of the Trubia plant, which, together with the Ferrod Arsenal, is equipped with a large quantity of American machine tools.

Charles Day, of the engineering firm of Dodge & Day, Philadelphia, read a paper on "Machine Shop Methods" before the S. K. C. Club at Pittsfield, Mass., on May 27.

Thos. F. Griffin, of Corrigan, McKinney & Co., Cleveland, who went to New Mexico last December for the benefit of his health, and who has recently been sojourning in California, is homeward bound and is expected to arrive in Cleveland the latter part of this week.

The board of public service of Cleveland has granted a permit to the American Steel & Wire Co. to build a double track railroad from the Central blast furnaces, Cleveland, to the steel works in Newburg. The road will be six miles in length, running through the city, and no expense will be spared in its construction, special care being taken to prevent accidents. No streets will be crossed at grade and the construction will conform to all the requirements of the city engineer. The road will be used for conveying hot metal and for general freight. Its building will result in a large saving of money now paid for the use of railroad tracks.

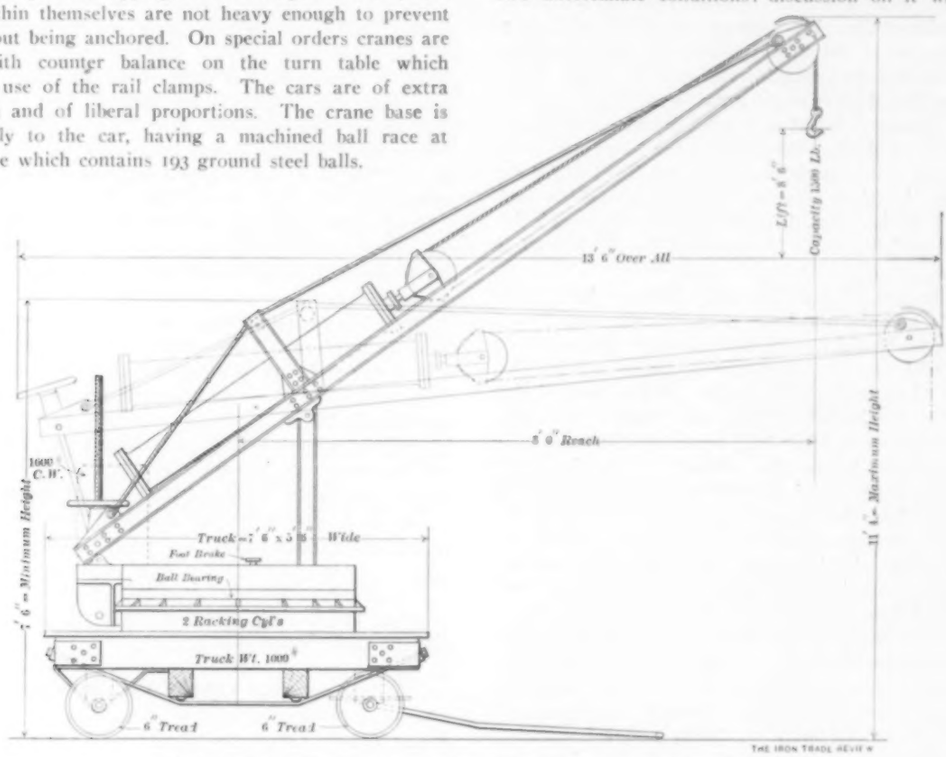
Burglars broke into the office of the steel wire mills of Kidd Bros. & Burgher, McKees Rocks, Pa., June 2, and finding nothing of value after dynamiting the safe, set fire to the plant. The main building, a long frame structure, was completely destroyed, entailing a loss of about $60,000.

PNEUMATIC REVOLVING CRANE.

The Garry Iron & Steel Co., of Cleveland, manufactures pneumatic revolving cranes, one type of which is illustrated herewith. These cranes are made in two forms, B and C.

B has a capacity of 1,000 pounds; a reach of 7 feet; hook lift of 12 feet 6 inches, and a total height from the rail to the top of the boom of 9 feet 2 inches. The C cranes are of similar design but of larger capacity and are made in 2,000, 3,000, 4,000, 6,000, 8,000 and 10,000 pound capacity, with a standard reach of 12 feet; a standard hook lift of 12 feet 6 inches, and a total height from rail to the top of the boom of 15 feet 8 inches.

Both B and C cranes are built mounted on a standard car and arranged for standard truck gauge. The gauge may be altered to suit requirements or cranes may be mounted on special hand truck for convenience in moving about in storerooms, warehouses or on platforms. The crane cars are equipped with a set of rail clamps which secure the car to the rail to prevent tipping when lifting the load; the machines within themselves are not heavy enough to prevent tipping without being anchored. On special orders cranes are furnished with counter balance on the turn table which obviates the use of the rail clamps. The cars are of extra heavy design and of liberal proportions. The crane base is bolted directly to the car, having a machined ball race at its upper edge which contains 193 ground steel balls.



CRANE BUILT BY THE GARRY IRON AND STEEL CO., OF CLEVELAND.

The bottom of the base is machined to receive the cylinder, rack, guides, pivot and stop. It has a projecting ring the under side of which is machined for rollers and brake, the bracket is equipped with rollers and air cylinder actuated by a foot valve convenient to the operator and is attached to the turn table, platform and hoisting cylinder on top of turn table. The hoisting cylinder is securely fastened to the turn table and the brake bracket, and is additionally supported on the top of turn table by means of the vertical members of the boom proper, which are attached to the top turn table. The air for hoisting is applied to this cylinder. The booms are made of heavy channels stiffened by top truss rods. Cables are ordinarily made in two parts for a hook lift of 12 feet 6 inches, which may be modified to suit the hook lift required. The air is applied in such a way as to permit the operator to stand on top of turn table and handle crane for all movements without changing his position.

The Garry Iron & Steel Co., also manufactures pneumatic cranes having a horizontal boom with trolley which racks in and out on the boom, thus giving four applications of power. The standard type of crane is furnished with motor for traversing the car up and down the track, or with hand power traversing arrangement if desired. These cranes are useful in loading freight cars, in coaling locomotives or in all situations where heavy lifting is required. Among the recent orders are the following: New York Central & Hudson River Railroad; the Lake Shore & Michigan Suthern; Chicago, Burlington & Quincy; Chicago, Rock Island & Pacific; Chicago & South Eastern; Cincinnati Northern; Lake Superior & Ishpeming; the Standard Oil Co.; Wm. Wharton, Jr., & Co., of Philadelphia; Edward J. Etting, of Philadelphia; the American Car & Foundry Co., of Detroit.

THE WAGE REBATE ON EXPORT TIN PLATE.

Formal announcement is made that it has been arranged to discontinue temporarily the collection of the 3 percent wage rebate from Amalgamated Association tin plate workers, in connection with the 25 percent drawback in wages to be returned to the American Tin Plate Co. on the filling of orders for export tin plate. The collection ceased June 1, and no statement is made as to when it will likely be resumed.

The movement to capture the tin plate drawback trade met two unfortunate conditions; discussion on it was prolonged for such a length of time by the workers that when it was finally agreed to it was too late to capture any large season business, this having been nearly all closed; at the same time the foreign makers immediately reduced their own quotations by about a shilling a box. It cannot be directly charged that this was done to meet the arrangement in the United States, but there is a suspicion that such was the case.

Under these conditions, some drawback business was booked, nevertheless, but how much cannot be learned. Then the domestic demand became very good, so that the company's union mills have been going at a rate that was hardly expected. All its mills that were in operative condition have been run to the fullest output possible since early in the year, and will be run to the utmost limit through August, the company being filled through that month, and now declining all business except for September shipment. The contributions to the 3 percent fund have been unexpectedly heavy, and would have continued so if the arrangement had been kept in continuous operation.

The Robert Aitchison Perforated Metal Co., Chicago, has closed a contract with the Anaconda Copper Mining Co., Anaconda, Mont., for two carloads of perforated steel screens. The company reports that orders are plentiful and that its factory is well filled up.

The Eastern Machinery Market.

OFFICE OF *The Iron Trade Review*,
ROOM 1909 NO. 150 NASSAU ST., NEW YORK, June 2.

The machinery trade in May in this vicinity was not as active as in the month previous. Here and there a house was found which reported its business for the month to be fully up to that done in April. This is especially true of the larger houses. The generality of machinery men, however, say that the month brought a lull in trade, due, in the opinion of some, to the many labor troubles in the industrial world, while other thought it was only natural that the beginning of summer should witness a slight reaction from the active times the machinery industry has enjoyed for many months.

Orders for small lots were the predominating feature in machine tools, all kinds of tools participating. The Niles-Bement-Pond Co. had an exceptionally heavy demand for its shapers, which it was unable to meet. Some of the buyers commissioned the firm to go into the outside market and purchase the shaper most resembling its own make. In the case of the Prentice Tool & Supply Co. the preponderance of orders was for radial drills. The turns in trade for which dealers must provide are illustrated in the case of a company which a few weeks ago sent a certain lathe to its Chicago office, but a few days ago was compelled to have it brought back to New York to fill an urgent order. Another firm had a milling machine and lathe in stock at its office here, but during the week its Chicago office called for the former and its Boston office for the latter.

The chief buyers of machine tools during the month were railroads, and the purchases were of only one or two tools at a time. Machine tool men continue to look forward with confidence to some excellent business from the railroads, but they notice a hesitancy on the part of the companies about submitting their specifications. Cases are known where even after bids were solicited and obtained for good sized lots, the companies came into the market for only a part, and no definite information could be had as to when they would call for the remainder. Prices are still unchanged, and are expected to remain so for the time being. Advices here are to the effect that at the forthcoming meeting of the National Machine Tool Builders' Association in Worcester the question of prices will receive considerable attention. It is a well known fact that the recent declines in pig iron have impelled many prospective buyers to look for some recession in the list prices of machine tools, although manufacturers maintain that in the majority of departments of machine tool construction, particularly labor, there has been no recession from the highest prices which have been reached, while labor has advanced in many cases. And in pig iron last year's contract prices were lower than the prices thus far named for the second half. Deliveries of machine tools have improved on the whole, but in milling machines, drills, and shapers, complaint is still heard.

One of the largest machine tool propositions that have found their way into the market recently is from the Loomis-Pettibone Co. and calls for tools aggregating from $150,000 to $200,000 for the new plant of the company at Elizabeth, N. J. The awards will hardly be made for some time, however, as the company is not making the progress in the construction of its new plant it expected, owing to labor disturbances. It intends to have all the details relating to equipment settled as soon as possible, and as already announced, will spend some $600,000 in this way.

Machine tool men are expecting to hear from the Southern Railway Co., in reference to the enlargement of its shops at Alexandria, Va. They have received official information that the company will be a purchaser of machine tools to the extent of several hundred thousands of dollars. The specifications for the equipment of the new shops of Henry R. Worthington, at Harrison, N. J.; the Ingersoll-Sergeant Drill Co., at Phillipsburg, N. J., and the Westinghouse Electric & Mfg. Co., at East Pittsburg, Pa., have not as yet reached the trade. These specifications are expected to do much toward relieving the dullness incident to the summer months.

In engines the month was particularly dull. One of the important interests in the trade reports that the largest order it received in the month was for a 75-h. p. engine. The majority of orders were for small horsepower engines. Boiler makers report that their trade during the month was fair at the best. In electrical machinery the influx of new business was gratifying, especially of orders for motor-driven tools, and for equipment in connection with street railway systems. Dealers in machinists' supplies enjoyed a fairly good trade. Wood working machinery was in fairly good demand. Published reports that an advance of prices in this line is probable have no foundation. As a matter of fact in no branch of the machinery industry has so much difficulty been experienced in maintaining prices, and sales at concessions are frequent. Attempts have often been made to get manufacturers together to prevent the wholesale cutting that has been going on, but these have met with failure.

There is nothing new to report in the foreign machinery market, so far as machine tools are concerned, manufacturers saying that domestic trade is still good enough for them to give it almost their entire attention. Electrical machinery manufacturers are still seeking orders abroad, and report some excellent business in consequence.

The Niles-Bement-Pond Co. had an April business fully up to that of any month in the present year. Some excellent orders came from railroads. The largest order booked by the company was for the equipment for the new construction and repair shops at the New Orleans Naval Station, consisting of many items, including an elevator—a total of $91,000.

The Lidgerwood Mfg. Co. is receiving many orders for hoisting engines. A few days ago its books showed 197 orders for hoisting engines which had not reached the shop in any form. The laborers employed in the company's foundry, thirty-one in number, have struck for an increase in wages from $1.75 to $2 per day. The company will not grant the demand. Work will not be commenced on the new plant at Newark, N. J., until September.

The B. F. Sturtevant Co.'s orders recently received for exhaust fans have been the largest in the company's history.

The Allis-Chalmers Co. is bidding on a very large engine contract and expects to get it. The company reports that current trade is satisfactory.

American Foundrymen's Association.

Interest in the Milwaukee convention of the American Foundrymen's Association, Tuesday, Wednesday and Thursday, June 9-11, has been growing in the past week, and the outlook is for a large attendance and a successful meeting. The special car of the New England foundrymen will connect at Albany with the train on which the New York delegation will go. The probabilities are, also, that the Pittsburg foundrymen will be well represented, as the members of the association there are all members of the American Foundrymen's Association.

The Cook County Founders' Association has arranged with the Chicago, Milwaukee & St. Paul Railway for special service between Chicago and Milwaukee for delegates and their friends. The Cook County Founders' Association, through its secretary, Daniel Huguenin, has invited all members of the A. F. A. to rendezvous in parlor L 38 at the Great Northern Hotel, Chicago, on Monday, June 8, and go in a body on the fast express train leaving Chicago from the Union passenger station, Canal and Adams Sts., at 9 a. m. Tuesday, June 9. This train arrives at Milwaukee at 11 a. m. Special cars will be attached to the train for the accommodation of the foundrymen. The Chicago foundrymen have appointed a reception committee to meet the visiting foundrymen who may come to the Chicago headquarters and arrange for their speedy transit to Milwaukee.

The Slater Engine Co., Warren, Mass., has made an assignment. The company is one of the principal industries of Warren, employing about 100 men.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

The reamer in *The Iron Trade Review* for May 21 rather takes my eye. It shows the flutes not running parallel as they are supposed to do in well regulated reamers for the finishing of any but tapered holes, but produced on exactly the opposite plan, the edges being directed respectively first to the left, then to the right and so on for the entire series of blades. The main reason why the cutters have never been put on a reamer so that they would incline in a right-hand spiral is of course that the reamer or the work being turned in this direction, there would be a tendency for the cutters to draw in and take too much of a bite. The reamer having both kinds of flutes has so much of an insurance against this kind of a risk, the two sets of cutters balancing the bad effects of each other.

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The nearest I have come to such a scheme is indicated at Figs. 1 and 2. This was, I believe, devised originally for brass finishers and is a rough way of getting at the object aimed at by the patent compound twist reamer. Fig. 1 is an end view, the piece of tool steel being first turned to size as shown by the circle at A and then the four sides planed away and touched up by a file to look like Fig. 2. It will be understood that B is the curved line A, Fig. 2 being a sketch in perspective of Fig. 1. This sawed-off wedge is a double ended affair which strikes the effect sought by the compound reamer and it has been a matter of more or less wonder to me whether either of these arrangements was the result of design or accident. Really it is of very little consequence whether the

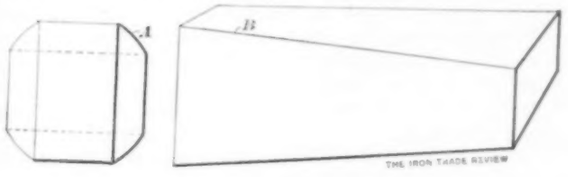

FIG. 1. FIG. 2.

GETTING A RIGHT AND LEFT HAND TWIST ON THE CUTTING EDGES.

thing was the result of a long and intricate process of thought or some other cause. The starting point of the reamer shown by Figs. 1 and 2 may have been in the sheer inability of the workman to file as straight a flute as he desired in the time he had set for the job. Then he found that the irregular flutes did not work so badly and this in turn led up to a choice of these off flutes as the proper thing.

* * * * *

I suppose that dire necessity, just as much as fool luck, has started many good inventions. And for that matter many a good thing has been started by a man who could not see any more than the immediate possibilities of the idea, as in the case of the farmer who, I am told, by fencing in his cow with rope and then to make assurance doubly sure sticking nails in the retaining rope, started an ambitious spectator along the path that led to the manufacture of the barbed wire fence. I do not vouch for this tale. I have heard many similar things. Take the well known Root blower, for instance. I had often heard that this was the result of experimenting on a rotary engine; and following the general likeness between the two classes of contrivances, pumps and engines, a good pump was finally made out of an indifferent engine. But this story was easily run to earth and through the kindness of the firm I can satisfy the curiosity of my readers who have any interest in the matter. The brothers, P. H. and F. M. Root, experimented with a rotary water wheel, not a rotary steam engine. Prior to and for several years after the start of their blower business, these brothers operated a woolen mill at Connersville, Ind. Power was generated with an old over-shot water wheel. They wanted to design a new wheel and started in and built one on the principle of a rotary blower. It was made of wood and of course when water was turned into it the wood swelled and the machine soon stopped. They took it back into the shop and dressed down the blades. During the shop test afterwards they found that the rapidly rotating blades created quite a blast of air. A Connersville foundryman was standing by and he made the remark, "That machine would melt iron." I have never heard of the Connersville company making water wheels, but the blower business, from a clear understanding of that timely hint, has grown to large proportions.

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This faculty of seeing the full value of a thing is not any too common. The blower was right there but was not obtrusive even to the men who made the machine. I have another instance of this sort picked up in an Eastern plant. The draftsman of the firm showed me a set of bins for finished work. These boxes were to be covered with doors. He said: "I wanted some arrangement to hold the doors open when work was put into or taken out of the boxes, but I could see no simple way of doing this to suit me. The doors came closely side by side and I could not hold one door by a latch of some kind on the next one in the row with any satisfaction. Mind you, I wanted a simple plan that would cost nothing to speak of, and would not worry the men who were to handle the doors. I was in a hurry for the covered bins and convinced myself that the best thing to do was to rush them together and then tackle the latch proposition when I had more leisure. I went down to the storeroom after they were put into service and thought I could now get an idea about the solution of

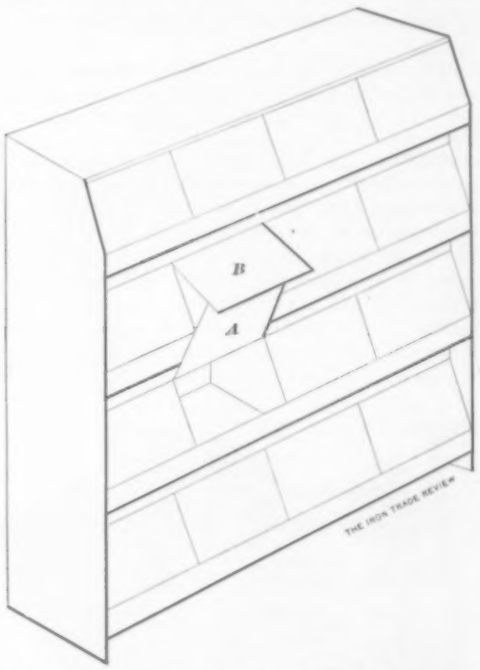


FIG. 3.—HOW THE DOOR OF THE BIN WAS HELD.

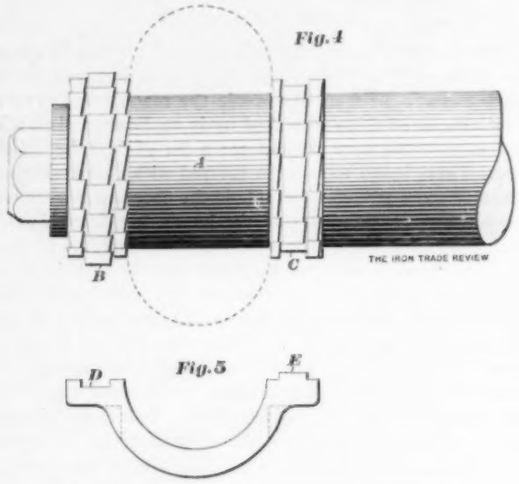
the problem. A man came along for some finished work, lifted up the doors A and B, dropped the latter on the end of the other and he could get at the contents of the bin O. K. I saw at once that a strip of wood running along the underside of the lids would prevent the lower one sliding out and A would then be securely held in place by B. But the thing worked nicely, as it was, had no complications and was another proof that the designer does not see all the good and bad points of his work as other people look at them."

* * * * *

Some may claim that this was more accident than invention on the part of the man who held up the doors by this means but it does seem to be the adaptation of means to ends, and this ability to bring things to pass is as truly called executive in the case of the aristocrative salary as it is known as gumption with the lower rates of pay.

Not everybody uses the slide rule; but those who know something of that instrument are familiar with the glass which is a part of the runner in the latest design. A strip of glass rests on the graduations and extends over the different scales. A line along the glass can thus be readily placed over the graduations. I dare say that this combination seemed so simple and effective as to be capable of no further improvement in

efficiency. It is evident, however, that if the line on the glass was not continuous there would be an added convenience in the setting. Maybe this was suggested by using an instrument where the line had been accidentally broken and thus by virtue



THE IMPROVEMENT OF A GANG MILL INTENTION.

of sheer necessity trying the expedient. The idea was workable and is now being applied to at least one make of slide rule.

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It may happen, but it rarely does, that the order to make a certain thing turns out a better result than the original plan contemplated. Given the ability to do and freedom to act, the workman may get in an improvement. There is any amount of risk in permitting the freedom of action unless there is confidence in the workman's ability to originate a useful form. It occasionally happens that the result either from mishearing the order or another cause is altogether different from the design. I have heard of an order which was intended to obtain a gang of milling cutters similar to those shown in Fig.

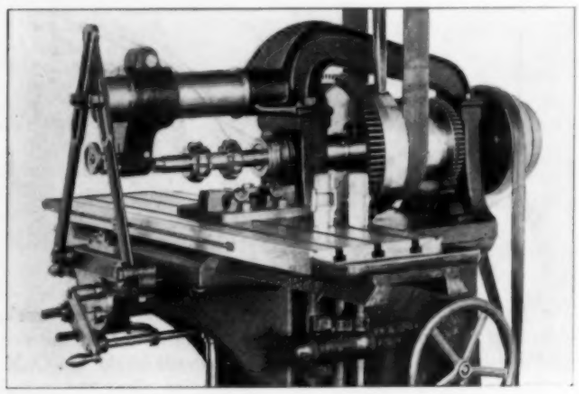


FIG. 6—MILLING THE BEARINGS IN HANGER BOXES.

4. The cutters were for milling the lugs shown on the cap in Fig. 5. A sleeve A spaces the cutters B and C in order to cut the lugs D and E correctly. By some misunderstanding the cutter was made with the shape of the dotted lines, Fig. 4, so that the inside of the cap was cut out at the same time. Having an impression that this had occurred at the Brown & Sharpe Mfg. Co., of Providence, R. I., I wrote them and am favored with the following note and the photograph reproduced in Fig. 6: "This was the first work milled by us in this way. The idea did not originate here. We had made cutters for a customer several years before for doing the same kind of work. As near as we can learn, the story of how we commenced to use it is something like this: The foreman of the machine shop gave the foreman of the cutter job an order for a set of cutters for milling the tongues on boxes. When asked if he was going to mill for the bearing, he said: 'I was not, but I am now.'"

NEW BOOKS.

"Lathes, Screw Machines, Boring and Turning Mills," is the title of an ambitious book of over 650, 5½x8½-inch, pages. The author, Thomas R. Shaw, in treating of the design and construction of this class of machine tools, brings to the task a cordial appreciation of the work accomplished in other countries than England. He does not lack an intimate acquaintance with the literature of the art and his selections are judiciously made, though they cannot be more than representative at the best. The limits of a single volume would not permit of a complete collection and machine shop engineering has advanced at too rapid a pace to permit the perfect record the author might desire. The work is a plainly practical reference book. Many of the illustrations have been reproduced from working drawings and the lavish display contributes to a ready apprehension of construction details. There are 425 illustrations. Some of these have suffered by the process of reproduction and many reference letters are indistinct. While the work is presented as a treatise on turning machines, we find in it a description of the Fellow's gear shaper. Yet as a rule the material is along the line indicated by the title.

The chapters on the making of an accurate lead screw, the comparison between different forms of lathe and other machine tool beds, electric drives, feed mechanisms, screw cutting, etc, have few novelties, but the information is useful and well arranged. The author has certainly made a creditable compilation from the practice of leading American, English, German and Swedish machine tool manufacturers and his comments on their products and methods are independent and vigorous (as for example his opinion on the ostrich-like secrecy of some English machine builders). There is a good index, a liberal amount of space to American work and such a practical presentation of the subject as would be expected from an expert in mechanical matters. The book is published by the scientific Publishing Co., of Manchester, England. Price 15 shillings.

"Steam Power Plants" is a book for the purchaser as well as the designer of steam plants. The author, Henry C. Meyer, Jr., M. E., has published a portion of the book serially and has probably had the benefit of the criticism any error might receive from such publicity. The present work is much more than a reprint, however, the original material having had a thorough revision with many additions. The work has 165, 6x9-inch, pages; 63 illustrations and 15 folding plates. Either the draftsman or the engraver is responsible for the arrangement of the lettering on plates 5 and 7. Some of this requires the book to be held upside down for reading purposes. As a rule the engraving and typography are well done. The selection of material and equipment, the location and calculation of the various adjuncts to a modern power plant are considered. There is an index and the contents are well arranged. The price is $2. Published by the McGraw Publishing Co., New York.

Three creditors of the Compressed Air Co., of 24 State street, New York, owner of the Rome Locomotive & Machine Works, Rome, N. Y., have filed a petition of bankruptcy against the company. The Compressed Air Co., has $300,000 bonds out and the locomotive company, $150,000. President Monkhouse, of the Compressed Air Co., says that the company is perfectly solvent and that the troubles are caused largely by differences among the directors. About two months ago the company offered to stockholders the privilege of subscribing to $200,000 of 5 percent 20-year bonds at 88.40, and receiving a bonus of 10 shares of common stock with each $1,000 of bonds. The subscriptions were conditioned on the disposal of the entire $200,000 issue. This bond issue was never sold and the company has been hampered for lack of working capital. Part of the bond issue was for new equipment of the locomotive works.

N. & G. Taylor Co. is making extensive additions to its mills at Cumberland, Md., which include new open-hearth furnaces with the necessary producer equipment, handling and charging apparatus, etc. General improvements are being made throughout the works which will add materially to capacity.

Philadelphia Machinery Market.

PHILADELPHIA, June 2.—There was quite a falling off in the demand for machinery during the month just closed. Few plants did a business comparing at all favorably with preceding months. Naturally as midsummer approaches there is a slackening in demand always expected, but it is gradual. This year it has come with something of a shock. The decline cannot be attributed to the season, as there is as much inquiry as ever and the need of machinery of all kinds almost as great as it has been for some time past. It is due almost entirely to the unsettled condition of the labor market. The strike fever pervades all classes of artisans and in many quarters is virulent. Employers of labor very generally are withholding orders for needed equipment until the labor question is more settled, not caring to add to their investments under the present conditions. One of the shrewdest men in mechanical circles here made the prediction almost a year ago that June would see a far reaching upheaval in this market, and at this writing it looks as though his prediction would be fulfilled to the letter. There are strikes all through the building trades, and many extensions to plants at a standstill in consequence. About 90,000 hands are on strike in the textile industry, and a fight is on between labor and capital with both sides well organized.

Molders have issued an ultimatum, expiring tomorrow, demanding a nine-hour day and a minimum wage of $3.25, and there is a meeting of employers called for today to consider the situation. It is not believed that the employers will concede the demands made, and it is quite likely that the union molders in the different shops will go out before many hours. Some of the machine shops have been preparing for the situation, and have good stocks of castings ahead; in fact, this future work has been no small factor in the filling up of foundries to a point where the delivery of castings has been anything but prompt.

Under the existing conditions the continuance of the hitherto good demand for machinery could hardly be expected, and it may be some little time before much improvement is to be noted.

There were very few transactions approaching magnitude in the May business, most of it covering machinery of very ordinary character. In the machine tool trade both orders and shipments were very largely made up of railroad and locomotive works requirements. It is doubtful if there was ever more business accruing from these sources than now. Foreign business is conspicuous by its absence. While a few orders have come into the market they are small and not at all indicative of interest in the American machinery markets.

It is announced that the Allison Mfg. Co., after a career of nearly 70 years, is going out of business. At one time over 3,000 hands were employed in the company's plant, in the manufacture of gondolas and flat cars, most of which were built on orders from Europe. The site of the works is to be taken by the Pennsylvania Railroad and the plant equipment is advertised for sale.

The Bureau of Supplies and Accounts, Navy Department, Washington, D. C., is advertising for tenders for a quantity of tools and other equipment for Eastern yards. The specifications, bids on which are to be in by June 10, include lathes, drills, motors, metal working machinery, grinders, a locomotive, milling machines, cold saws, a traveling crane, and plate bending rolls, and cover altogether 103 classes.

The J. W. Paxson Co., builder of foundry equipment and manufacturer of foundry supplies, found May a very good month in point of both orders and inquiries. Some large installations of sand blast apparatus were made, and in other lines of equipment orders were of good size. Among the cupolas shipped was an 80-inch to the new plant of the J. L. Mott Iron Works Co., Trenton, N. J.; an 80-inch to the plant of McNab & Harlin, Paterson, N. J.; a 76-inch to Williamson Bros. Co., Philadelphia; and a 67-inch to A. Weiskittel & Son, Baltimore Md.

The Newton Machine Tool Works had a good month as far as shipments are concerned, though most of them covered machines of ordinary and staple character, mostly in single lots. Among the larger shipments was the immense cold saw, before reported as being under construction, to the Carnegie Steel Co. at Homestead, Pa., and a large vertical milling machine and some cold saws to the new Montreal Locomotive Works. Inquiries during the month were fairly numerous, and were largely for locomotive and railroad tools.

The Barr Pumping Engine Works have a good deal of business in hand. There are in the works in course of construction a 25 million gallon vertical triple expansion pumping plant for Kansas City; a 5 million gallon plant for Newton, Mass.; and a 3 million gallon horizontal cross-compound condensing plant for Plymouth, Mass. In their small pump department they are very busy, and orders coming in are quite plentiful. Among the orders in course of preparation for shipment are some from Denmark and Sweden.

The Keystone Machine Tool Co. has been getting out some machines of large size of late, shipments during the past month including a horizontal boring machine weighing 35,000 pounds to the Western Electric Co., Chicago. The company has other large work going through its shops, so much in fact that the projected removal of the plant to a location in the northern outskirts of the city is now put off until late in the fall.

The Espen-Lucas Machine Works reports that May was a good month for shipments, a number of cold saws being despatched to different parts of the country. The company has just issued a new catalogue covering its line of cold saws and boring machines.

The Philadelphia Pneumatic Tool Co. reports larger sales during May than in any previous month this year. It has booked orders of good size for both foreign and domestic shipment, and many new customers have been added to its list during the past few weeks. The demand for the Keller rotary drills and riveting hammers is particularly noticeable. Among the orders taken are some from the following: Tennessee Coal, Iron & Railroad Co., Great Northern Railway Co., Lake Erie & Western Railroad, Lake Shore & Michigan Southern Railroad, Illinois Steel Co., Cambria Steel Co., Lorain Steel Co., Baldwin Locomotive Works, American Car & Foundry Co., American Bridge Co., International Harvester Co., Kilbourne & Jacobs Mfg. Co., the Bucyrus Co., C. & G. Cooper Co., Camden Iron Works, Detroit Shipbuilding Co, New York Navy Yard, and Mare Island Navy Yard. Foreign shipments were made to London, Paris, Brussels, Berlin, Copenhagen, Milan, Buenos Ayres, and Brisbane.

The Eynon-Evans Mfg. Co. has nearly completed the alterations to its works, and will shortly have all the facilities required for promptly turning out its lines of injectors, valves, condensers, and other engineering specialties. The company has yet a lot of equipment to purchase, including a compressor, molding machines, crane, and other machinery.

The Quaker City Electric Co. is very busy, having a great deal of work on hand. The company reports an excellent demand for electric plants for both light and power. Among the installations recently made is a power and lighting plant for the factory of Schofield, Mason & Co., Philadelphia; power plant for the Lebanon Textile Co., Lebanon, Pa., and a lighting and power plant for W. C. Urner & Co., Spring City, Pa.

Thos. H. Dallett & Co. report business in a satisfactory condition at their works. The demand for their pneumatic tools and electric portable drills is good, and they have quite a number of orders on their books.

Hilb & Bauer, of Cincinnati, dealers in old material, deny that they are members of the so-called Indiana Scrap Iron Dealers' Association, which is reported to have held a meeting at Indianapolis last week. The Cincinnati firm say that no one had any authority to use their name in connection with such organization.

Representatives of about fifteen of the largest companies engaged in the manufacture of harness and saddlery met in Chicago June 1 to discuss the formation of a combine with a capital of $35,000,000. It is expected that thirty of the largest concerns in the country will join the combination. The incorporation papers were taken out in Trenton, N. J., last week, and the following directors were elected: B. W. Campbell, Cincinnati; Julius Kiper, Chicago; Jesse H. Thomas, Nashville; Edward A. Konatz, St. Paul; Stewart S. Kurtz, Canton, O.; Elmer S. Fisher, Minneapolis; Elliot Norton, New York; Owen Cartwright, Louisville, Ky.; E. A. Hendrickson, Indianapolis; Jacob Meyer, St. Louis; Thomas Sloo, New Orleans; Charles G. Ranno, Manchester, N. H.; and Arthur Stemm, Cincinnati.

TRADE PUBLICATIONS.

Eli Whitney is the subject of the latest short story from Wyman & Gordon, of Worcester, Mass. The essay is an appreciative study of a shop pioneer, for the inventor of the cotton gin was, according to the account, an early if not, indeed, the earliest worker in the making of interchangeable parts on the factory system. The pamphlet is prepared in an interesting style and will be sent to anyone by Wyman & Gordon, who are publishers only to this extent, the business of the firm being the manufacture of special forgings.

The new series of "Examples of Rapid Milling" is a 32-page pamphlet of illustrations and data on twenty-eight operations. These examples suggest the possibilities of the Cincinnati geared feed millers and are taken from actual practice. The pamphlet has been prepared for free distribution among shop men and embodies the recommendations of the Cincinnati Milling Machine Co., of Cincinnati, on the economical use of the miller.

Catalogue D has been received from the Espen-Lucas Machine Works, of Philadelphia. This covers a well illustrated variety of cold saw cutting off machines, boring machines, milling machines and automatic saw sharpening machines. The several machines are made in a number of sizes and are of very substantial appearance.

The American Spiral Pipe Works, of Chicago, has a new catalogue which shows that pipe of this kind is now being made in heavier gauges and larger sizes, from 3 to 40 inches in diameter. The catalogue is in handy form and includes some twelve pages of tables of value to anyone concerned with hydraulics.

"Points on Packing" is the title of a little pamphlet treating on the qualifications of good packing and the characteristics of Jenkins packings in particular. The gaskets, gasket tubing, union rings, water cock washers, discs, pump valves, etc., made by Jenkins Bros., of New York, have their merits set forth with some detail.

The general catalogue, No. 53, treats of the pumping machinery manufactured by the Stilwell-Bierce & Smith-Vaile Co., of Dayton, O. Single and duplex pumps, triple expansion and compound pumping engines, vacuum hydraulic and triplex power pumps, jet and surface condensers, air compressors, etc., are illustrated on most of the 114 pages contained in this issue. Several pages are devoted to useful data which will be found of value in the installation and operation of these machines. The firm issues other catalogues devoted exclusively to compressors, feed pumps, power pumps, condensing apparatus, water wheels, etc..

The Northern Electrical Mfg. Co., Madison, Wis., has a new bulletin, No. 1130, which shows direct current units of the Corliss type, of steam high speed engines and generators, as well as generators built for connection to steam turbines. The array of illustrations depicting the range of modern engine-generator practice makes a showing of uncommon interest.

The "Long Arm" System Co., of Cleveland, O., has in Bulletin No. 6 a description of the system and the safety of electric power doors for marine service. This bulletin will be followed within a few months by one more complete and which will be fully illustrated. A thorough description of the horizontal door and the hatch gear will then be added.

Morgan Continuous Rod Mill for France.

By a contract recently entered into the Morgan Construction Co., of Worcester, Mass., will furnish for the St. Denis works of J. Mouton, of Paris, one of the largest steel and wire producers in France, a Morgan continuous two-stand rod mill with accessory equipment. The office of Julian Kennedy, Sahlin & Co., Norfolk St., Strand, London, through which the order is placed, gives the following particulars: The mill, which is almost a duplicate of the rod mill recently ordered by the Dominion Iron & Steel Co., of Sydney, Cape Breton, Canada, and of the two double rod mills of the Sharon Steel Co., will consist of a continuous roughing mill, having three trains of 10-inch diameter rolls, and a finishing mill, consisting of ten trains of rolls, the last of which is speeded to give a velocity to the departing wire rod of 3,100 feet per minute. The mill is to be served by four automatic laying reels, and is equipped with Edwards flying shears, Morgan continuous suspended roof heating furnace, and Morgan continuous gas producers. It will be driven by a compound condensing engine, high-pressure cylinder 36 inches diameter, low-pressure cylinder 62 inches diameter, length of stroke 60 inches, indicating 2,000-h. p. with steam at 120 pounds. The capacity of the mill running on rods of No. 21 French gauge (4.9 mm. diameter) is 115 tons of rods per working shift of 11 hours.

National Machine Tool Builders' Association.

The convention of the National Machine Tool Builders' Association to be held at Worcester, Mass., June 9 and 10, promises to be well attended by members from the Central West as well as New England. No formal program has been prepared but reports of committees will constitute the chief business. Present conditions in the trade and prices of tools will no doubt come up for consideration. Joseph Flather, of Nashua, N. H., is president; Wm. Lodge, of Cincinnati, first vice president; W. P. Davis, of Rochester, N. Y., second vice president; P. E. Montanus, of Springfield, O., secretary, and Enoch Earle, of Worcester, Mass., treasurer.

Employers' Association Officers.

The board of governors of the new Building Trades Employers' Association, New York, has elected the following permanent officers: President, Charles L. Eidlitiz, of the Electrical Contractors' Association; first vice president, L. K. Prince, of the Iron League; second vice president, Hugh Getty, of the Master Carpenters' Association; chairman of the board of governors, Otto M. Eidlitiz, of the Mason Builders' Association; secretary-treasurer, William K. Fertig, of the Marble Association.

In the new constitution the objects of the association are set forth as being "to foster the interest of those engaged in the erection and construction of buildings and other structures; to reform abuses relating to the business of persons so engaged; to secure freedom from unjust and unlawful exactions; to obtain and diffuse accurate and reliable information as to all matters affecting such persons, to procure uniformity, harmony, and certainty in the relations between employers, employes, mechanics and laborers."

The Chicago Engineering & Constructing Co., with a capital of $250,000, has acquired the engineering and contracting business of the firm of Weston Brothers, consisting of Charles V. Weston and George Weston, with offices at 711 Merchants' Loan and Trust building. The officers of the company are Charles V. Weston, president; George Weston, vice president; George A. Yuille, secretary and general manager; Hervey B. Hicks, counsel. These, with Addison E. Wells, Fred A. Wells and Edward B. Burling, all of Chicago, make up the board of directors.

The city council of Lorain, O., has passed an ordinance calling for the issue of $200,000 bonds for the improvement of Black river from Lake Erie to the site of the new tube mills soon to be built. The action of the council was in pursuance of an election held May 15, 1902, at which the issue was authorized on the strength of a statement from President Coolidge, of the Lorain Steel Co., that if the city would obligate itself to make the improvements he was confident that the United States Steel Corporation would authorize the building of the tube works.

At Birmingham it is estimated that industries in that field are making improvements representing between $30,000,000 and $40,000,000. Among these improvements are five new furnaces now in course of construction and the rebuilding of three furnaces. One of the furnaces, that for the steel plant at Gadsden, is expected to make a record as to construction. It is the first of the four 350-ton blast furnaces projected, and since Oct. 27 last one main stack 108 feet high has gone up, with four stoves 20 feet in diameter and 95 feet high. Nine batteries of boilers are ready for business, as are also the engine room, cast bank, pig machine and other departments necessary for operating the furnaces. The lining for the various stacks is being placed.—[Manufacturers' Record.

The Shops of the E. W. Bliss Company, Brooklyn, New York.

BY JOSEPH V. WOODWORTH.

Within the shadow of the great bridge, and but a block from Brooklyn's water front, in a locality where the refining and working of metals goes on unceasingly and the building of machinery appears to be the vocation of all, is situated one of the largest and finest equipped machine manufacturing plants in the world. The shops referred to are those of the E. W. Bliss Co., manufacturers of presses, drop hammers, shears, dies and special machinery, also owners of the Stiles & Parker Press Co., manufacturing presses and dies; the United States Projectile Co., manufacturing projectiles, hydraulic forgings, gears, pinions, gas vessels, etc., and the Orr & Hess Machine Co., Ltd., manufacturing coining and embossing presses. The Bliss plant proper comprises two large modern brick buildings which cover an entire square block, bounded by Plymouth, Pearl, Adams and Water Sts. The buildings are connected on the Plymouth and Water St. sides, the center being open. The smaller building, which comprised the original shops, is four stories in height, while the large one is six stories. A block to the right of the machine shops is the foundry, covering a floor space of about 30,000 feet, while a walk of two blocks in the opposite direction brings one to the forge shops, covering about 10,000 square feet.

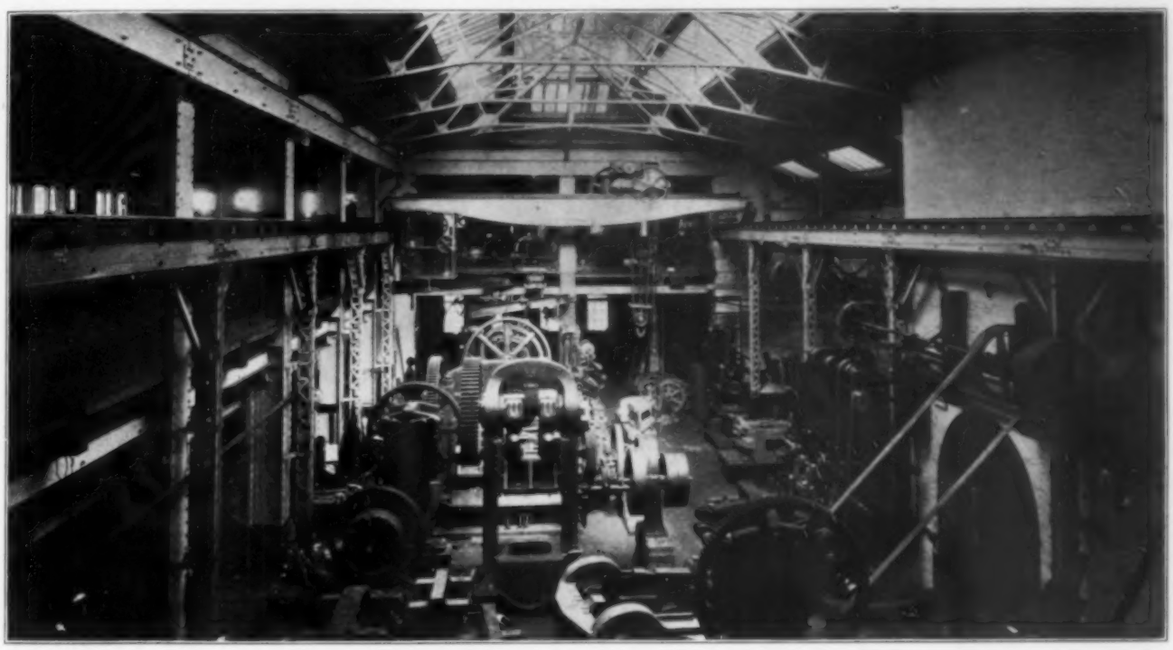


FIG. 1.—VIEW IN END OF PRESS ERECTING DEPARTMENT, SHOWING PRESSES UNDER CONSTRUCTION AND ONE OF TWO ELECTRIC CRANES.

All machinery manufactured by the Bliss company is produced in the Bliss shops proper. The manufacture of projectiles and torpedo war-heads is carried on in another large plant situated at First Ave. and Fifty-third St., South Brooklyn. Dies of every description and for every purpose, from those for producing tobacco tags to the great drawing dies for drawing steel shells of large diameters, are produced; presses of all types from the delicate sub press for watch work to the massive 60-ton toggle drawing press, with its own engine for heavy drawn work; also drop hammers, from those with drops of only a few pounds to those weighing 1,000 pounds; as well as special machinery for innumerable purposes are designed and built, while one entire floor is devoted to the manufacture of the Whitehead torpedo for the government.

It will be only possible in this article to give brief descriptions of the majority of the great number of departments, relying on the photos accompanying to assist in giving an idea of the work done by the Bliss company.

All told the men employed in the Bliss machine shops number about 1,200, the majority of whom are directly or indirectly engaged in the designing and building of improved machines, tools and dies for the manufacture of sheet metal goods. The Bliss company makes a specialty of this important branch of the machine industry and during the last quarter of a century has expended money freely in the effort to produce perfect sheet metal working machinery.

The photos here shown were taken by the firm's own photographer, who is head of a department which has become under his management quite a factor in the selling of the shops' products. When a new machine is built a photo or several are taken of it and hundreds of prints made, which are sent to users of such machinery in all parts of the world, thus letting them know simultaneously of any improvement in machinery for which they have use.

Figs. 1 and 2 are views taken of the department where all the heavy presses and drop hammers, or any other heavy machines are erected. This consists of a one-story building opening on the large building and is in the center of the works. It runs the entire length of the block, has a heavy glass roof which gives plenty of light and is equipped with a number of heavy machine tools and two 20-ton electric traveling cranes which are in use continually transporting heavy parts and frames of presses from one point to another. All machining of very heavy castings, such as the large press frames, etc., is done right in the erecting department, several heavy planers and boring mills being distributed at different points with regard to convenience. The work done in this department is accomplished by two gangs of men under the supervision of two foremen—William Clausen and John Beadle. Both have been in the employ of the Bliss company for over 25 years and are experts in the erection of the heavy machinery manufactured by the firm.

Fig. 3 shows one of the two large Betts planers in the erecting department. As will be seen, it has three large toggle press frames lined up on its platen, so that the planing of the locating surfaces may be accomplished on all three at one setting. To the right of the erecting department for the large presses is the section devoted to the building of the smaller sizes of power presses and the foot presses. This department takes in the entire first floor of the new building. William King has charge of all this work and has a large number of men under him. The number and variety of presses built here are sur-

prising, and a trip down the room gives one the impression that the types of power presses in use are innumerable.

Across the yard, to the left of the main erecting shop, on the first floor of the old building, is the planing and milling room. Here are a vast number of large, small and medium size planers, boring mills, horizontal and vertical, and a line of about fifteen vertical milling machines. All the planing and boring, except the very large work, is done here, as well as all the milling. The principal work done on the vertical millers is the milling of the large die forgings and punch blanks down to filing lines. However, other work is also done on them, though not in as large quantities as the other. It is in this department that the large cast iron drawing dies are machined; the vertical boring mills being used for this work. As many of the cast iron dies are of chilled iron the machining of them is a rather difficult job, necessitating special cutting tools and considerable skill and judgment on the part of the workmen.

The entire second floor of both buildings is given over almost entirely to the making of dies of all descriptions from the simplest plain blanking type to the intricate engraved and sunk types. Fig. 4 shows a section of the department where the blanking, bending, piercing, gang and embossing dies are made. In this department a great number of skilled and highly paid

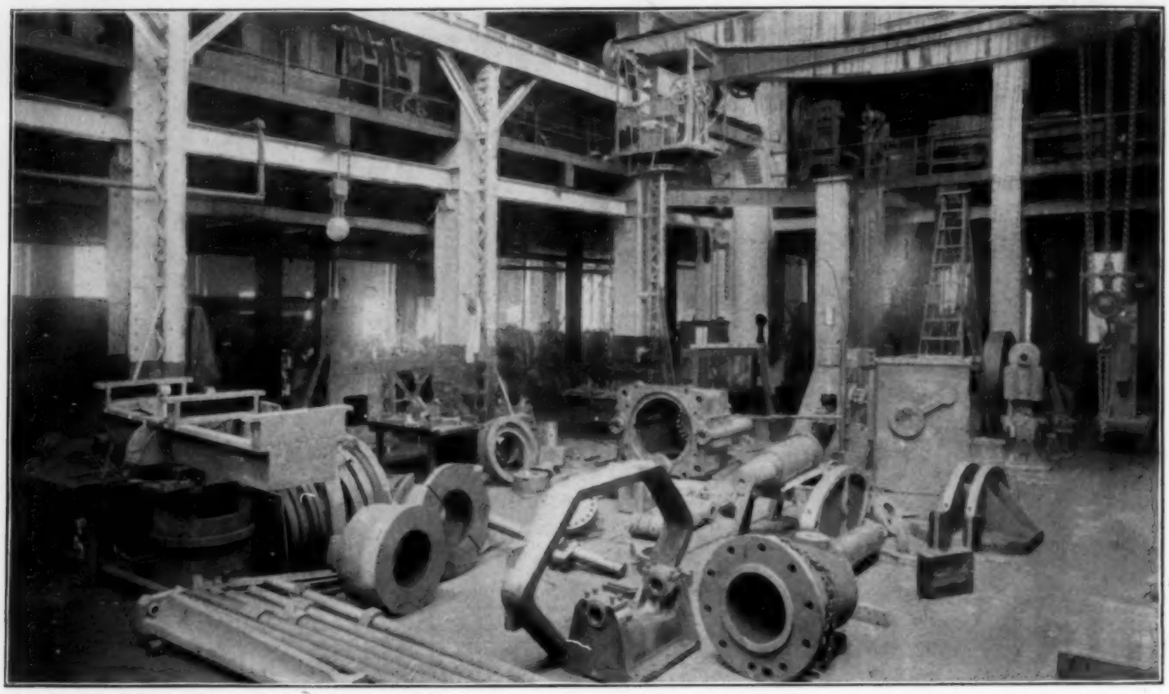


FIG. 2.—ERECTING DEPARTMENT. PRESS IN SECTIONS ON THE FLOOR READY TO BE BOXED FOR SHIPMENT.

die makers are employed, and the variety of accurate work turned out by them is astonishing, even to one familiar with such work. As will be understood, the results accomplished in the production of work in this department depends almost entirely on the skill of the workmen, for although machinery and tools have been invented for the lightening of the load of mechanics in other branches of metal working, the work of the die maker remains largely a matter of skill and hand work. To stand and watch some of the men in this department engaged with chisel, file, graver or scraper in the working out or sinking of an intricate or artistic die is indeed a treat to the admirer of skill and things mechanical. This department is under the charge of Mr. F. Kessler, himself a skilled die maker and die sinker who has been with the firm for years and introduced many improvements in the making of dies.

Fig. 5 is reproduced from a photo of the gang of lathes in the combination and double-acting drawing die department. This part of the works is under Mr. Rigby's charge, who is a specialist of many years' experience in this branch of die making. No job of drawing and forming sheet metal is too obstruse or intricate for the making of a set of dies, and the way the department handles a punch or die forging in the lathe and works out artistic curves and shapes is a revelation in tool handling and manipulation. The accuracy demanded in the finished work turned out in this department is great, and as the dies are constructed almost entirely of steel forgings, great care is required first in the machining of the parts, then in the hardening and tempering, and lastly in the grinding in order that inaccuracies may be avoided. The spoiling of a die or a punch forging is a very rare occurrence.

The drawing room is in charge of A. J. Beyer, an expert designer of special and sheet metal working machinery. The scheme of the room is admirable. Ventilation is adequately provided for, as well as plenty of light. On one side the light is from skylights, while large windows serve the same purpose on the other. Metal lockers are provided for the apparel of the men. For artificial lighting electricity is used exclusively.

The offices of the company take in the entire front portion of the sixth floor of the main building. The main office is at the corner, while stretching away from it is a long hall on either side of which open separate offices of the advertising manager, engineers, specialists, directors, president and other officers' rooms.

On the top floor of the old building the photographing department is situated. This section of the works contains all the modern apparatus required in the taking, developing and fixing of photos. A large electric blue-printing machine is also located here and all printing is done by it. In cases against the walls are stored thousands of negatives comprising photos of almost every device, die and machine that has been produced in the shops for years. At the rear of the photo department, and extending for the entire remaining length of the top floor, is the section reserved for the storage of samples of sheet metal work for which tools and dies have been made. There are thousands of samples of sheet metal ware here. Articles which one would never think could be made of sheet metal are there; from barrels and mandolin cases to bottles, baskets and furniture. From every die or set of dies that goes out of the Bliss shops a sample of work is secured and stored away in the sample room for reference. The pattern shop is situated in a room jutting off from the large building. It is fitted with all the modern appliances and machines for accurate pattern making and keeps a large force of pattern makers busy. All the patterns for the presses, etc., as well as those for special machinery, are made here.

Aside from the regular manufacturing of presses and dies the Bliss company devote one entire floor of the large building to the construction of experimental, special and model machin-

ery. A view of this department is shown in Fig. 6, and an idea of the work done there may be gained from a glance at the mass and variety of machinery in course of construction shown located indiscriminately on the floor. This department is one of the busiest in the works, and an inspection of it is an education to any one interested in experimenting and model work, as well as a revelation of what is being accomplished in the line of inventing and developing labor-saving machinery.

For a number of years the Bliss company has had the contract with the government for building the Whitehead torpedoes, and has designed and built many special machines, tools, fixtures and devices for doing the intricate work necessary in the manufacture of these engines of war, as well as to carry on their production economically and expeditiously. Many of the machines and tools in use are extremely novel. One entire floor is equipped with tools and machinery for the manufacture of the torpedoes, and a large force of skilled workmen is kept constantly engaged in the building of them. Fig. 7 is a view of one end of the torpedo floor. Here is a large number of specially constructed lathes and boring machines which do the work of boring, turning and polishing the torpedo bodies, noses and mechanism cases. An excellent view is given of these machines as they appear at work. The war-heads which form one end of the torpedoes are produced in the Bliss company's projectile works in South Brooklyn, being die-formed from white hot blocks of steel in hydraulic presses of great power.

Fig. 8 is a view of the assembling department of the torpedo floor, showing finished torpedoes, war-heads, rudder and engine cases, as well as miscellaneous parts, which go to make up the torpedoes, scattered around. In the tool, gauge, stock and inspection department of the torpedo floor are kept all the special small tools, gauges, templets and percision instruments for the inspection of finished work according to the government requirements. Here are also kept quantities of finished small parts which go to make up the mechanisms by which the torpedoes are driven.

Naturally, one expects to find a tool room or rooms where small tools, stock and supplies may be conveniently placed, so as to allow of their systematic and handy distribution. It may surprise many to learn that in this large establishment there is only one tool room in which the articles required for carrying on the general work are kept. To be sure this tool room is of large size and the system of distribution among the employes is such that no inconvenience is encountered. It is situated at the back of one of the upper floors of the large building, and contains all the small tools, parts and supplies required by the workmen. The system of distribution is somewhat different from that in vogue in most large establishments, in that the men do not go to the tool room for what they want, but instead have it brought to them. The system might be called the "bell boy" system, in that each gang, or a certain number of men, have a boy at their disposal whose duty it is to take a slip filled out by the workman stating what he requires, and proceed to the tool room with it and return with the tool, part, or supplies required. For all tools a workman's check is required, while for parts or supplies such as waste, emery cloth, etc., a slip signed by the foreman is necessary. This system seems to possess advantages over others as it has been in use almost since the inception of the Bliss shops. At any rate they do not appear to be in favor of discarding it for any other. The "bell boys" are not hired as apprentices, though not infrequently they become such.

The forging department, in a separate building two blocks away, is equipped with modern furnaces and a number of powerful steam hammers. Here are forged all of the crank shafts used on the Bliss presses, as well as all the die forgings used in the machine shops. Here are also hardened and tempered all of the large dies, both blanking and drawing, which are too large for the die makers to handle in the ordinary furnaces in the machine shops.

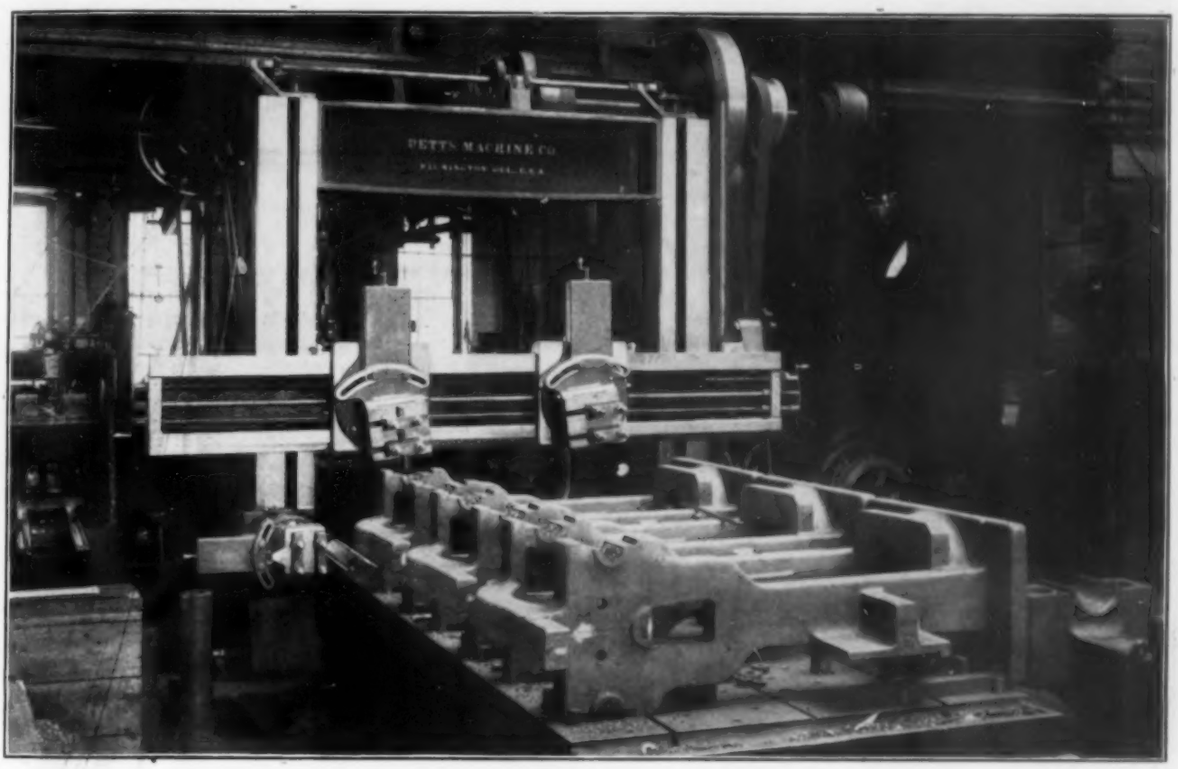


FIG. 3 —PLANING THE LOCATING SURFACES OF THREE LARGE TOGGLE PRESS FRAMES.

The foundry is in a new building which was constructed very recently, and the number of men finding employment there, as well as the amount of work done, is indicated by the amount of floor space covered—30,000 feet. It is equipped with electric traveling cranes, elevators and other modern appliances for making the handling of heavy castings an economic and expeditious matter. A specialty is made in this foundry of castings of special quality, the castings being mainly of great size and weight. Green sand, dry sand and loam castings for all purposes are turned out as well as those for the firm's own use.

The superintendent of the Bliss machine shops is John Flynn, who has been wtih the firm almost since its beginning, and has risen from machinist to superintendent of the big plant while in its employ. To Mr. Flynn are due many of the in-

novations introduced in the works during the past years tending to economic manufacturing, while the skill and ability of his foremen and the grade of workmen under them, the majority of whom have worked in the shops for years, and the high state of discipline existing in the shops indicates that the superintendent is possessed of good executive as well as mechanical ability.

President Schwab gave out an interview in New York last week in which he said: "I have just returned from a trip among our mills in the Pittsburg district, where I find everything in the best possible shape, this being especially true of the labor situation. Reports of serious labor difficulty in any departments of our business are without foundation. Business continues good, and we are booking just as many good orders as we were a year ago. We have now sufficient business booked to run us up to the first of the year. We are just concluding the purchase of pig iron for the third quarter of this year, and will say that we are taking practically all the iron that has been offered us, and will still have a very considerable shortage in our requirements. The price for this pig iron is $19.35 per ton, Pittsburg."

The Buffalo Refrigerating Machine Co., formerly located at Buffalo, N. Y., with works at North Tonawanda, N. Y., is now affiliated with the Marine Engine & Machine Co. at Harrison, N. J. The main office will be at Harrison and all communications should be sent to the former company at that address.

FIG. 4.—WHERE THE BLANKING, FORMING, BENDING, PIERCING AND EMBOSSING DIES ARE MADE.

FIG. 5.—GANGS OF LATHES IN COMBINATION AND DOUBLE-ACTING DIE DEPARTMENT. PUNCH AND DIE FORGINGS ON FLOOR.

EXPERIMENTING WITH THE TALBOT PROCESS.

The paper of Benj. Talbot on the "Continuous Open-Hearth Process," as read before the May meeting of the Iron and Steel Institute, was printed in our issue of May 28. The discussion on Mr. Talbot's paper, which is summarized in several British journals, was substantially as follows:

Mr. Edwin Martin (Carnegie Steel Co.) said, with reference to the operation of the Jones & Laughlins' furnace, he had a little data. They had troubles to start with, to which everyone was liable, but, from the results produced so far, he could not see why it was necessary to put up such expensive furnaces. He was told before leaving America that the produce of Jones & Laughlins' furnace was 98 percent, and they were running from 1,200 to 1,400 tons per week. Now in the ordinary pig and iron process, as practiced at the Homestead Steel Works, Pittsburg, the furnaces would give about 650 tons. The size of the furnace, they would naturally suppose, would be taken at the cost rather than the measurement. They might have a very expensive small furnace, and one not so expensive larger in area. Even that 1,400 tons, the maximum output of the Jones & Laughlins, was not any more than the two smaller ones of the Homestead Works. The one furnace which produced this continuous metal would cost between $400,000 and $500,000, whereas ordinary small furnaces could be put up at a cost of not over $100,000 for the full equipment. When they first started out, the object of the continuous process was to get frequent heats, and small ones, the idea being that they could have a tremendously large furnace, with small cranes to handle small quantities, rather than the expensive ma-

chinery necessary to handle 40 tons or more. But now the large continuous furnaces were producing 40 tons, which was the objection first made to running the ordinary furnaces in such large quantities, as it made too much steel to send to the mills at one time, without having a very extensive soaking pit

Mr. Edward Riley (London) wanted to know how far this process had been taken up in Germany. They knew the Germans had made great progress in the manufacture of basic steel. When they knew in many cases in Germany that they scrapped their complete works to build up modern plants, it

FIG. 6.—EXPERIMENTAL AND MODEL DEPARTMENT.

arrangement The cost of repairs of the Talbot furnace, which was under their jurisdiction, showed for repairs 58 3-10 cents per ton, as compared with 34 cents for the ordinary pig and ore, and the furnace at Pencoyd, since February 6, 1901, to May 7, 1902, had only averaged 54.85 days in use. In the pig and ore practice, as used at Homestead, they got a yield of 97.76 ingots, and 3.31 of scrap, showing a gain of 1.07. He would like to know why the change was made from 20 tons to 40 tons, when one of the claims of the process was the advantage it had in being able to give small quantities, and often, more resembling the quantity given by the Bessemer process.

Mr. Percy C. Gilchrist (London) said the results given by

seemed strange that they had not adopted Mr. Talbot's process.

Mr. E. H. Saniter (Middlesbrough) said, with a view to comparison, he had constructed the following table:

Location.	Surface area.	Week's make—Ingots and Scrap.	Make per sq. ft. of area.	Analysis of Metal.			Yield.
				Silicon.	Sulphur.	Phosphorous.	
	sq. ft.	Tons.	Tons.				
Pencoyd	270	650	2.4	1.0	.06	.9	106
Jones and Laughlins	640	1,415	2.21	1.2	.06	.1	100.74
Frodingham	400	624	1.56	1.0	.06	1.8	104.8

In looking at this table, it must be remembered that, to make

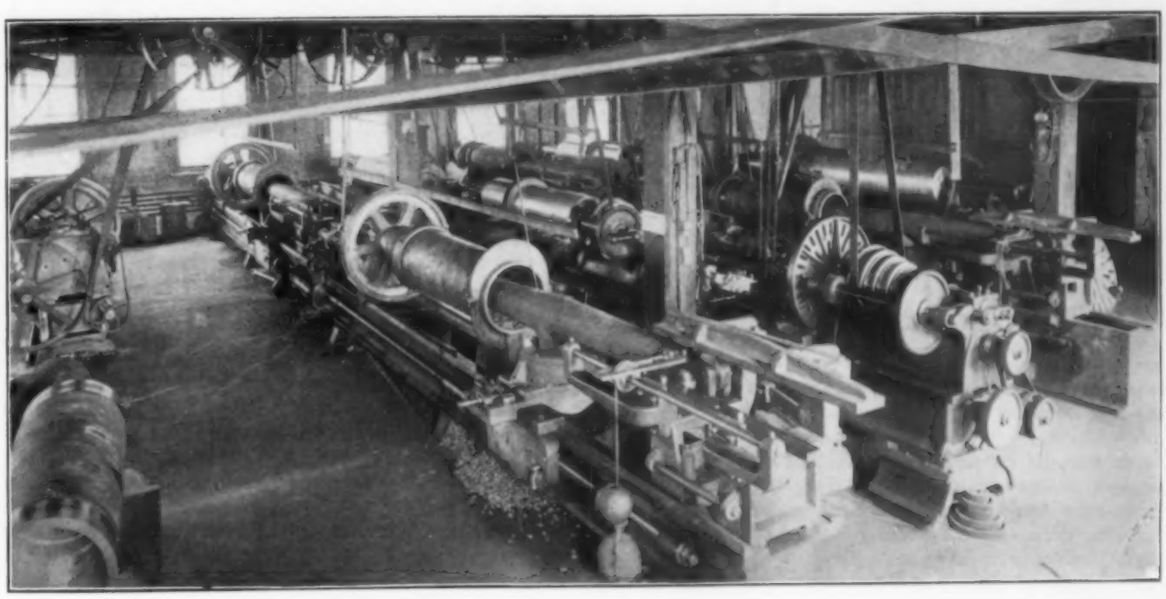


FIG. 7.—TURNING AND BORING TORPEDO BODIES.

Mr. Talbot in his paper showed conclusively that his method was one that was especially advantageous to the basic process. He should like to ask Mr. Talbot whether he could give the amount for basic material, both when magnesite and dolomite were used, and also whether he had been able to try the addition of molten basic material.

the Frodingham week equal Jones & Laughlins', one day must be added, making the tons per square foot 1.82. What struck him in this comparison was that, when using hematite, both the output and the yield were inferior to that obtained on metal containing 0.9 phosphorus. Then, looking at the Frodingham results, we found the output was materially decreased, both as

compared with Pencoyd and hematite iron. This greatly lower output, equal to 20 to 25 percent less than Pencoyd, was attributed by Mr. Talbot to increased impurities—that was to say, an extra 0.9 percent phosphorus, as compared with Pencoyd iron. That question of how far increased impurities would affect the make was very important, and he would like to ask Mr. Talbot if he had any idea how much further the output, as compared with Frodingham, would be reduced by using lean Cleveland iron containing 1 percent silicon, .2 percent sulphur, 1.5 percent phosphorus, or ordinary basic iron, containing high percentages of phosphorus. The lurid picture Mr. Talbot drew of the difficulties of working molten metal in fixed furnaces would certainly frighten him had he not had some slight experience of what the difficulties were. In this and the previous paper there were numerous analyses of the steel made at Pencoyd and Jones & Laughlins,' but the paper was without any information with reference to the steel made at Frodingham from British iron. In reference to Mr. Talbot's remarks on sulphur, he might say that moderate amounts of sulphur could be removed in fixed basic furnaces without delaying the process, and, further, that it could be done more economically and with greater regularity and certainty than by the use of manganese, either in the blast furnace or the mixer.

Mr. F. W. Paul said, with reference to the author's remarks as to the same hearth at Pencoyd being at work for 3½ years, he thought that was a feature of the process which conveyed, in practical language, the possibilities of increased output, by reason of absence of delays which took place in ordinary basic practice, through holes occurring in the bottom and banks, even when the bottoms were renewed at intervals of one to two years.

The information conveyed as to scrap was particularly interesting, for hitherto the consensus of opinion was that the Talbot process did not lend itself to using up scrap. The plunging of scrap into a bath of molten steel, combined the advantage of preventing its taking up sulphur when exposed for some time to producer-gas during melting. In his Presidential Address to the West of Scotland Iron and Steel Institute in 1897, he referred to the difficulty in the removal of silicon in the open-hearth process. Since then his views appear to have been fully confirmed ; for, with charges of about 50 tons in ordinary basic working, it was usual to overcome silicon troubles with a view to large outputs by working charges composed of 50 percent molten pig-iron and 50 percent scrap. As regarded the Talbot process, after the addition of 10 percent of molten pig-iron, the resulting average composition of the charge was, approximately, 0.50 percent carbon and 0.12 percent of silicon, which, he thought, most would agree was an ideal composition to commence boiling operations, and it resulted in the whole mass coming on what might be termed a natural, vigorous boil, without undue foaming, with its accompanying loss of metallic iron or scorification of the banks of the furnace. There had been numerous special commissions to America to ascertain wherein their methods differed from English, and to the valuable reports already issued, he thought they might succinctly add that, whereas in this country they muddled through the inevitable troubles of high silicon with poor outputs and yields, the Americans appreciated its importance by making low silicon iron, and by still further mixing the molten metal with 50 percent of scrap.

Mr. George Ainsworth (Consett) said they were told that they were not to accept one or two weeks' work as the result of a process, but as he was concerned on behalf of the Ingot Makers' Association in dealing with the wages of the Steel Smelters' Association for the Frodingham furnace, he had put before him officially the results for a series of weeks and for several months, and it was only fair to Mr. Talbot to say that the weeks that he produced might be taken as fair average weeks.

Mr. R. M. Daelen (Düsseldorf) said Mr. Edward Riley had put the question why the continuous process had not yet been introduced into Germany. Most of the German pig-iron contained a large amount of phosphorus, and the basic Bessemer process was, therefore, the most economical and best for Germany, and so long as they had that it would be very difficult to introduce another process. The ordinary open-hearth process by melting scrap with a little pig-iron, gave them very good results, and there was no reason to introduce the big furnaces which were necessary for the continuous process. His opinion was that it would be a difficult matter to introduce another process for producing steel cheaper—unless it were possible to melt more ore in the ordinary furnace than was done now.

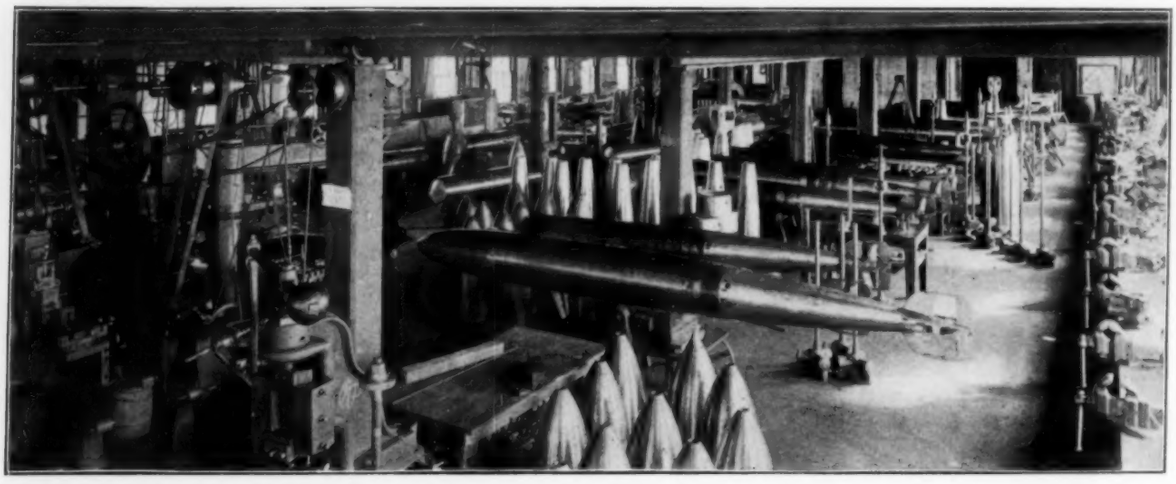


FIG. 8.—ASSEMBLING DEPARTMENT OF TORPEDO FLOOR.

Professor Turner (Birmingham) referred to the composition of the slag obtained. Hitherto the difficulty was that the slag was of no value and could not be dealt with under the ordinary basic process. But he was glad to see that they had now a slag producing over 16½ percent of phosphoric acid, and, therefore, a slag which he presumed would be of considerable value for agricultural purposes.

Mr. F. W. Harbord said with reference to Mr. Martin's remarks about the furnace producing 600 tons as against 1,200 to 1,400 of the Talbot process, it practically meant this, that the output in the Talbot was double in the same sized furnace working under the ordinary conditions. Against that was the question of cost, and it really became a question whether the less amount of labor employed did not soon pay for the extra cost of the process. With reference to the 40-ton charges being made, he took it that this was a matter of experience, very largely.

Mr. Talbot in closing the discussion congratulated Mr. Martin, the metallurgical expert of the Carnegie Steel Co., on taking such an interest in the furnace at Jones & Laughlins'. He was rather afraid that perhaps it was considered such a dead letter that they would not look into it any more. The difficulties which Mr. Martin had mentioned were entirely mechanical. He had no responsibility in the design at all. Mr.

Jones, when he went into this question of the continuous process, said that they considered that they had such a staff in their works that they were able to manage it all themselves. He said: "Very well, Mr. Jones. I do not think you are right; but go ahead." With reference to Mr. Martin's remarks about the capital cost; when he told them that this furnace was erected on an ash bank, which was 50 feet high, above the mud of the river, and that it had to be erected on arches so that they could go underneath, like so many caverns, they would understand that it required a little money. They might have spent $400,000; but he would say this, that they would not spend half that money per furnace. Mr. Martin wanted to know why they took 40-ton heats, and 20-ton at Pencoyd. That was a question of a percentage of the size of the furnace. If in works there were gas arrangements and soaking pits, they preferred 40-ton heats. They had tried 10-ton heats at Pittsburg, but it took the same time, in proportion, as 40-tons. When they tapped there was a certain loss of time.

With reference to the report of the Pencoyd furnace, he was rather at a disadvantage, because it now belonged to the Trust, and he had not got the detailed records. But one point that appealed to him, as an outsider, was this: Mr. Martin said that the furnace was not a success, because certain items were more expensive than others. As a practical business man, he would ask why the Trust ran that furnace in its present shape today, when it could, without any expenditure, go to the ordinary process?

Mr. Riley had asked why the process had not been introduced into Germany. Well, they were not particularly anxious about Germany. Of course, there were very fine basic Bessemer plants in Germany, but the speaker did not agree with Mr. Daelen that he made it cheaper than with the continuous process, and Dr. Wedding considered that the latter had a great future in Germany.

Mr. Saniter had asked him about impure Cleveland material. All he had to say about that was that such metal ought not to go into a steel furnace. The question was, whether it would cost more money; if they took everything into consideration—it was not the question of the extra time—it was the indirect cost. To run a steel works successfully, you must get product, and a process that takes ten hours instead of eight hours is a very expensive operation.

Industrial England Tied Hand and Foot.

Sir Walter Burton, a prominent attorney of London, who is now visiting in New York, said a few days ago: "The trouble, to a great extent, with the laboring man here today, as it is in England, is that he is too easily influenced by the oily talk and schemes for his betterment, poured forth by agitators who permeate the trades unions and who are at the same time making an easy living out of the workingman's weakness and ignorance. It is somewhat surprising to me, however, that a large and prosperous country like yours should be so persistently disturbed by labor strikes. One naturally expects to see the reverse the case. In England, where work is not so plentiful and wages very much lower than here, strikes, nevertheless, are few, when compared with the number that occur annually in this country. Perhaps that may be due in no small degree to the unaggressiveness of English employers, who, on a threatened strike, generally give way to the demands of the unions.

"The labor unions over there have us now tied hand and foot, and it would undoubtedly mean an irreparable loss to our trade at home and abroad were the large employers of labor to form a counter organization among themselves for the purpose of fighting against the sweeping dictates made to them and enforced by the labor unions. The fight would be a long and ruinous one to both contestants and it would take the country years to recover from the struggle."

Messrs. William A. and Arthur H. Hawgood have closed a contract with the American Shipbuilding Co. for a freight steamer of 6,500 gross tons capacity, to be completed April 1st, 1904. The new ship will be of the latest type with all modern improvements, and will be especially adapted for all the latest unloading machinery. It will cost about $280,000.

NEW ARMOR PLATE MILL AT CREUSOT.

London *Engineering* of May 1 has a description of the armor plate mill, the largest of its kind, recently completed by Schneider & Co., at their Creusot works, from which we take the following:

Figs. 1 and 2 are a vertical section and a plan of the works, the references to which are these:

A. Coal bunkers.
B. Tubular boilers.
C. Reheating furnaces.
D. Reversing steam engine driving the new mill.
E. Roughing mill.
F. Finishing mill.
G. Ingot furnace.
H. Fans and feed-pumps.
I. Steam engine driving the slab mill.
J. Slab mill.
K. Ingot cells.
L. Cooling-down space for large-area plates.
M. Cross-cutting shears.
N, N'. Edge-cutting shears.
O. Annealing furnaces.
P. Plate-straightening machine.
a, *a'*. Castors for shifting plates.
R. Space for final inspection and delivery.
S. Delivery track.
T. 85-ton overhead electric traveler.
U. 15-ton overhead electric traveler.
V. 8-ton overhead electric travelers.
X. Underground passage for removing scale.
Y. Roll lathe.
Z. Machine for reversing plates in course of rolling.
A, A. Cooling-down bed.

The old armor-plate mill at the Creusot Works consists of one set of rolls only, 3 metres (9 feet 10 inches) in length, and .950 metre (37.40 inches) in diamerer, placed on one side of a 3,000-horsepower reversing steam engine, this driving also a large cogging mill for bars, placed on the other side. The armor-plate mill was also used for the manufacture of large ship and boiler plates. As it consisted of only one set, it had become insufficient, and when a heavy output of plates of large area was called for, the rolls had no time to cool down, and the lubrication of the necks gave trouble. Moreover, the manufacture of armor-plates generally roughened the rolls to some extent, and made it difficult to turn out ship and boiler plates with a perfectly smooth surface.

In order to improve matters in this respect, the new plant contains two mills—a finishing mill near the gearing housing, and a roughing mill, the latter being the further from the engine. The two sets being on the same side of the engine, this allows a great lift for the roughing rolls, with comparatively short coupling shafts; these are on a very slight incline. The lift can reach 1.200 metre (47.25 inches), and is obtained by raising the top roll of the finishing mill to its maximum height —.500 metre (19.65 inches). Placing both mills on the same side of the engine has also the advantage of reducing the distance over which the slabs and plates have to travel in course of rolling.

The roughing and finishing rolls are of the same dimensions:

Length of rolls	4.250 m.	(13 feet 11$^{9}/_{16}$ inches)
Diameter of rolls	1.200 m.	(3 feet 11¼ inches)
Length of necks	.750 m.	(2 feet 5½ inches)
Diameter of necks	.850 m.	(2 feet 9½ inches)
Total length of rolls	6.550 m.	(21 feet 5⅞ inches)
Weight of each roll	43,300 kg.	(42 tons 12 cwt.)

Notwithstanding the large dimensions, it is possible to roll a plate the width of which is only .800 metre (31½ inches); in the older mill, in which the rolls are .950 metre (37.40 inches) in diameter, the minimum width of plate had to be 1 metre (39.37 inches). This result is obtained by means of a suitable device fitted in the guides. The arrangement is specially useful for rolling slabs.

The four standards forming the two housings are of cast iron, and the same pattern; their smallest section measures .4860 square metre (5¼ square feet). Their total height from the base of the crossbeam, which supports the hydraulic cylinders, to the top of the pressure screws is 12.215 metres (40 feet), of which 5.705 metres (18 feet 9 inches) are below the floor level. They weigh 54 tons without any fittings. The pressure screws are .350 metre (13¾ inches) in diameter out-

side the threads and .310 metre (12⁸/₁₆ inches) at the bottom of the threads, with a 40-millimetre (1⁹/₁₆ inches) pitch. Their speed corresponds to a travel of 8 millimetres (⁵/₁₆ inch) per second. The screws are worked by a reversing electric motor of varying speed and fitted with an electric brake; the motor is 20 nominal h.-p., but works normally at 10 or 12 h.-p. It is provided with two starting devices, one for the roughing and one for the finishing mill, both within reach of the roll-man in charge, whose stand is in close proximity to the pressure scale.

The roughing mill is used for the rolling of armor-plates and for the rough rolling of ship and boiler plates. The latter are finished in the second mill.

The rolls are driven by a twin-cylinder reversing steam engine. Diameter of cylinders, 1.700 m. (5 feet 7 inches); stroke, 1.500 m. (4 feet 11 inches).

Reversing is governed by an auxiliary steam engine; this can also act on the cutoff to vary the power of the main engine,

Diameter of shaft..... .800 m. (2 feet 7½ inches)
Diameter of journals..... .680 m. (2 feet 2¾ inches)
Length of journals..... .500 m. (1 foot 7¹¹/₁₆ inches)

The cog-wheels revolve in grease; the bearings are of cast iron with white metal lining.

The feed-rollers placed in front of the rear of the mills are so arranged that all their mechanical parts are below the floor level. Schneider & Co. prefer this arrangement. Were these parts to be placed above ground, they might be made easier of access for inspection and maintenance; but, on the other hand, they would interfere with the traffic in the shop, and would have to be railed in, in accordance with the French factory laws. Their inspection affords no great difficulty, access being had to them by raising some of the cast iron slabs that form the flooring of the shop. Holes are cut in the slabs to facilitate lubrication. The sets of rollers are built very strong; at the parts nearest the mills they are carried in cast steel longitudinal beams, in brackets supported on springs. The cast

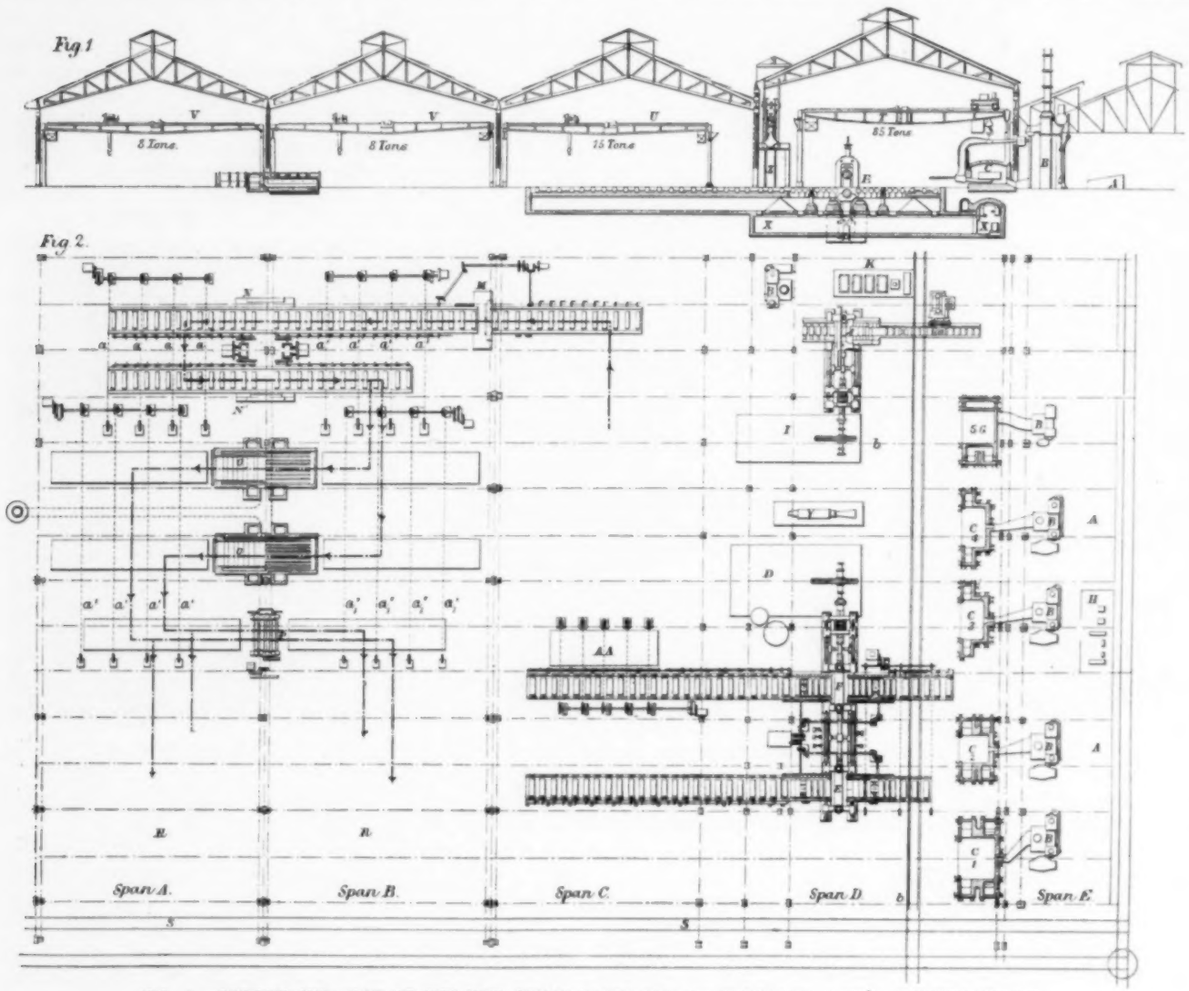


FIG. 1.—SECTION AND PLAN OF THE NEW ARMOR PLATE MILL AT SCHNEIDER & CO'S. CREUSOT WORKS.

thus securing a more economical working for the latter than is the case if reversing is carried out with a fixed stroke for the link motion, and when the steam valve alone is operated, in order to wire-draw the steam more or less. The engine runs at a normal speed of 90 revolutions per minute. The toothed wheel and pinion have double helical teeth .900 metre (35⁷/₁₆ inches) wide; they have a ratio of three to one, and are nickel-steel castings of special quality. The pinion is cast in one piece. The toothed wheel is built up of two castings—the center, weighing 23 tons, and the toothed rim, weighing 24 tons. The latter is a very fine casting; the teeth required no machining. The engine drives the lower set of rolls through the pinion and wheel.

The driving gear for the upper set of rolls consists of two cast-steel cog wheels, with double helical teeth, keyed on a forged steel shaft.

Total width of teeth.....1.030 m. (3 feet 4⁸/₁₆ inches)
Pitch diameter .....1.350 m. (4 feet 5⅛ inches)

steel beams are lengthened by wrought steel beams for the sake of lightness. The rollers are of cast iron, on wrought steel shafts. They are .720 metre (28⅜ inches) in outside diameter, and their speed is, on an average, 12 revolutions per minute. Their level is 60 millimetres (2⅜ inches) above the floor level, and a special method, followed in the construction of the shafts which carry the gearing that drive the rollers, makes it possible to lower the latter by 35 millimetres (1⅜ inches) at that part where the longitudinal beams are of cast steel. This arrangement facilitates the rolling of very thick plates, and will allow a wear on the rolls of about 2 inches on the radius, without it being necessary to raise the lower roll of the mill, by means of wedges placed underneath its bearings, as is usually done, to make up for the wear. In the old mill, the maximum wear on the rolls did not exceed 1 inch on the radius. The toothed wheels forming the gearing of the feed-rollers are steel castings. They are driven by a steam engine, and not by an electric motor, owing to the roughness and the

varying nature of the work required, also by reason of the gravity of a complete breakdown in this important part of the plant. Its dimensions are the following: Diameter of cylinders, .350 m. (13¾ inches); stroke, .360 m. (14⅛ inches); normal speed, 150 revolutions per minute. The power taken hardly exceeds 35 horsepower, although the engine can develop more than double. The steam distribution is by straight links, and the engine is reversed by hand by a driver who stands on the platform between both mills.

The sets of rollers are built over underground galleries with inclined planes (see Fig. 1), in which are collected all the scale and waste produced in course of rolling; these galleries correspond with those under the furnaces. The roller beds are connected together by traversers, to carry the plates in course of manufacture from the roughing to the finishing mill; they serve also to rectify the position of a plate on either roller bed. The plant is completed by hydraulic pivoting and reversing devices; these are governed by the man who controls the engine which drives the rollers.

The reheating furnaces are five in number. Those marked 1 and 2 are for reheating the armor plates in course of rolling; the furnaces 3 and 4 are specially set apart for the manufacture of large ship or boiler plates. Furnace No. 5 takes the armor plate ingots as they are received from the steel works; this prevents them from cooling down, it insures also a better working condition for the reheating furnaces proper, and does away with the interior cracks which are very often caused, in large ingots especially, by a too rapid heating or cooling. The ingots are brought opposite the furnace doors, on the track *b b*, Fig. 2; they are lifted from the trucks and placed in the furnace by means of a device suspended from an overhead traveler. The same device is used to take the ingots from the furnaces and carry them to the rolling mills. The coal is received on the track to the right of Fig. 2, and is unloaded into the bunkers A. The five furnaces have plane grates, supplied with an air blast at a pressure of 35 millimetres (1.37 inch) of water, by two fans. The armor plate furnaces have four grates; they are so built that the plates are heated both from above and from below, the flames from the two front grates being led to the top surface of the plates, and those from the two rear grates to the bottom surface.

FURNACE NO. 1.

Dimensions of grates, .950 x 1.400 m. (37.40 in. x 55.11 in.)
Total grate area (four grates), 5.32 sq. m. (57.09 sq. ft.).
Dimensions of hearth, 4.250 x 4.500 m. (13 ft. 11 in. x 14 ft. 9 in.).
Area of hearth, 19.12 sq. m. (205.60 sq. ft.).

FURNACE NO. 2.

Dimensions of grates, .850 x 1.200 m. (33.46 in. x 47.24 in.).
Total grate area (four grates), 4.08 sq. m. (43.06 sq. ft.).
Dimensions of hearth, 4.200 x 3.200 m. (13 ft. 9 in. x 10 ft. 6 in.).
Area of hearth, 13.44 sq. m. (144.28 sq. ft.).

The furnaces No. 3 and No. 4, used for ships' boiler plates, have only two grates. Their dimensions are equal:

Dimensions of grates, .850 x 1.200 m. (33.46 in. x 47.24 in.).
Total grate area (two grates to each furnace), 2.04 sq m. (21.53 sq. ft.).
Dimensions of hearth, 2.800 x 5.400 m. (9 ft. 2 in. x 17 ft. 8 in.).
Area of hearth, 15.12 sq. m. (162.55 sq. ft.).

The furnace No. 5, above referred to, differs from the four others in that it does not contain fixed fireproof supports to carry the plates; in this furnace the plates are carried on movable supports. It is provided with two grates:

Dimensions of grates, .850 x 1.200 m. (33.46 in. x 47.24 in.).
Total grate area (two grates), 2.04 sq. m. (21.53 sq. ft.).
Dimensions of hearth, 2.800 x 5.400 m. (9 ft. 2 in. x 17 ft. 8 in.).
Area of hearth, 15.12 sq. m. (162.55 sq. ft.).

The ashes and scale from the 14 grates fall into a cast iron flue, the bottom of which is closed by a hollow flanged flap-valve. Water is kept in the valve, to slake the ashes and provide a tight joint, in order to allow the air draught supply under the grates. The flues are emptied into a truck which runs in the gallery underneath the furnaces.

The hot gases from the five furnaces are used to heat the water-tube boilers. The boilers in connection with the furnaces 1 to 4 contain four sets of tubes placed one above the other, the three lower sets being specially for the production of steam. The top set acts as an economizer; the feed water flows first through this top set, then into an upper drum, and through the three evaporation sets. The water, by circulating first through the top set of tubes, over a length of 23.5 metres (77 feet), takes almost all the heat units that remain in the hot gases after these have flowed round the lower tubes. When the grates are provided with air blast, the gases reach the basis of the chimney at a temperature of 200 to 220 degrees Cent. (392 to 428 degrees Fahr.); in average working this temperature hardly exceeds 160 to 175 degrees (320 to 347 degrees Fahr.). In the first case, the economizer set absorbs about 14 percent of the total heat which is used by the three evaporating sets; in the other case, the proportion is only about 9 percent. When the coal used for firing the furnaces is of good quality, the boilers evaporate, on an average, 5.5 kilogrammes of water per kilogramme of coal. The furnace No. 5 does not give out sufficient heat for evaporation, and its boiler is used for heating the feed-water previous to its delivery to the four other boilers. The feed-water is taken from a tank, to which is led the exhaust steam from the steam hammers of the puddling shop. This exhaust steam heats it by about 30 degrees Cent. (80 degrees Fahr.).

The four bays, A, B, C, and D, Fig. 2, covering the whole plant, are served by electric overhead traveling cranes. Those of bay D are an 85-ton crane which can lift a maximum of 90 tons, and one of 15 tons. Both are on the same track, and have a 26-metre (85 foot) span. They serve both the furnaces and the mills. The traveling crane in bay C is a 15-ton crane, similar to that of bay D. The bays B and A are each provided with an 8-ton traveler, the span of which is 27.6 metres (90 feet 6 inches). All the cranes, except the 15-ton one of bay D, can travel over the delivery track S S (Fig. 2). The traveling, traversing, and lifting actions are governed by three independent continuous-current motors, at 220 volts. There are two lifting speeds.

All the space under the bay C which is not taken up by the roller beds of the mill and of the shearing machine M, the straightening slab of the finishing mill, and the delivery track S S, is set apart for the cooling down of the plates, their inspection and marking. When the plates have sufficiently cooled down, they are inspected by the works engineers, and by the Government inspectors or those of the purchasing company; they are then stamped for the cutting of test pieces, and can only then be taken to the shearing machine, following, as a rule, on the floor level, the course shown in Fig. 2. The shearing machines are three in number, marked M, N and N¹ in Fig. 2; they are of the same pattern, and are driven by a reversing steam engine placed on the floor level. The shearing machines have been designed to shear a thickness of 2 inches of steel, the breaking strain of which is 35 tons per square inch. That marked M is used for cross-cutting the plates; it can shear 4.200 metres (13 feet 9⁵/₁₆ inches); those marked N and N¹ are for edge shearing; their blades are two metres (6 feet 6¹¹/₁₆ inches) in length. The latter are provided with small blades fitted at right angles with the larger blades, to cut the shearings crossways, in length of about 6 feet. The roller-beds on the ground level, for feeding the shearing machines, are worked electrically.

There are two annealing furnaces for ship and boiler plates. Their dimensions are the following:

Dimensions of grates, 1.150 m. x 1.400 m. (45.27 in. x 55.11 in.).
Total grate area (four grates), 6.44 sq. m. (68.90 sq. ft.).
Dimensions of hearth, 13 m. x 4.400 m. (42 ft. 8 in. x 14 ft. 5 in.).
Area of hearth, 57.20 sq. m. (615.70 sq. ft.).

Each furnace has four grates, provided with steam blast. The plates are placed in, and removed from, the furnace by means of an electric capstan.

The plate-straightening machine is near the two annealing furnaces. It has been designed to straighten cold steel plates, the breaking strain of which is 35 tons per square inch, the maximum width and thickness that can be dealt with are 4.150 metres (13 feet 7⅜ inches) and 30 millimetres (1⁹/₁₆ inches) respectively. Like the annealing furnaces and the shearing machines, it is level with the floor. It contains seven straighten-

ing rolls .350 metre (13¾ inches) in diameter, four at top and three underneath. The top rolls are balanced by hydraulic pressure. The machine is driven by a reversing electric motor of 75 horsepower. The required pressure is given to the top rolls by an 8-horsepower reversing electric motor. The speeds are: For straightening, 4.400 m. (14 feet 5 inches) per minute; for pressure, 10 mm. (.39 inch) per minute.

In order to insure an adequate steam supply for the new plant, and to increase at the same time the production of steam for the whole rolling mill department of their Creusot Works, Schneider & Co. have put down a separate boiler house; 96 metres by 15 metres (315 feet by 49 feet), adjoining the new mills, two sets of eleven multi-tubular boilers each, the principal dimensions of which are the following:

Grate area of each boiler, 4.5 sq. m. (48.44 sq. ft.)
Total grate area (22 boilers), 99 sq. m. (1065.68 sq ft.).
Heating surface of each boiler, 200 sq. m. (2152.86 sq. ft.).
Total heating surface (22 boilers), 4400 sq. m. (47,362.92 sq. ft.).

These boilers are of the general type used at the Creusot Works; they are provided in the rear with a movable plate that can be turned down for cleaning the grate. The ashes collect in an underground gallery, from which they are removed by an hydraulic hoist. The feed-water is heated by the exhaust steam from the rolling mill engine and from the feed pumps; it flows through an economizer before being supplied to the boilers.

A heavy lathe, marked Y on Fig. 2, and served by the overhead travelers of bay D, is used to turn the rolls. Its height of centers is .950 metre (37⅜ inches), and it can turn all pieces from .275 metre (10.82 inches) to 1,200 metre (47.25 inches) in diameter. It has 48 different speeds—from .26 to 26 revolutions—and has been designed for using cutting tools made of self-hardening steel. A special device serves for cutting the wabblers and trunnions.

This mill makes it possible for Schneider & Co. to roll armor plates, commercially, weighing from 60 to 65 tons. Later on, should circumstances demand, this weight could easily be greatly increased; it would only be necessary to modify the method of charging the reheating furnaces. With regard to ship and boiler plates, the firm are now able to supply these sheared, annealed, and straightened up to 4.150 metres (13 feet 7⅜ inches) in width, and circular plates up to 4.200 metres (13 feet 9⁵⁄₁₆ inches) in diameter. The current commercial length contemplated for rectangular ship and boiler plates is 20 metres (65 feet 7⅜ inches), but there will be no difficulty in exceeding this when found necessary to do so.

The business of the Pressed Steel Car Co. so f..r this current fiscal year shows an increase in gross receipts of about 26 percent over the same period in 1902.

STEWART-EATON CINDER CAR.

The Stewart-Eaton cinder car is illustrated in the two engravings. It is manufactured by Frank M. Eaton, of the Union Trust Bldg., Cincinnati. Fig. 1 shows the cinder pot in actual operation and Fig. 2 is a rear view of the same tilted to show the method of breaking up the skull. The improvement is the subject of a recent patent. Already about 30 of the cars are in use, and the manufacturer has a dozen under way. The photographs were taken at the Virginia Iron, Coal & Coke Co.'s furnace, at Roanoke, Va., and these cars are also in daily use at the following plants: Woodward Iron Co., Woodward, Ala.; Lacey-Buek Iron Co., Trusville; Republic Iron & Steel Co., Thomas, Ala.; Sloss-Sheffield Iron & Steel Co., Birmingham, Ala.; Alabama Consolidated Coal & Iron Co., Ironton, Ala.; Empire Iron & Steel Co., Greensboro, N. C.; Central Iron & Coal Co.'s Furnaces, Tuscaloosa, Ala.

The inventors have devised a slag or cinder pot, which is adapted to be tilted by steam or compressed air, and, in addition to providing means by which these slag pots may be easily dumped, another object of the invention is to provide additional means for thoroughly ridding the pot of its contents. After continued use the bottom of the pot becomes coated with a scale. For the removal of this coating a plate is placed on the bottom of the pot, and this is provided with a stem which is connected to a lever operated by the piston of a steam or compressed air cylinder. The scale may, in this way, be quickly and easily broken up by simply admitting steam or air to the cylinder.

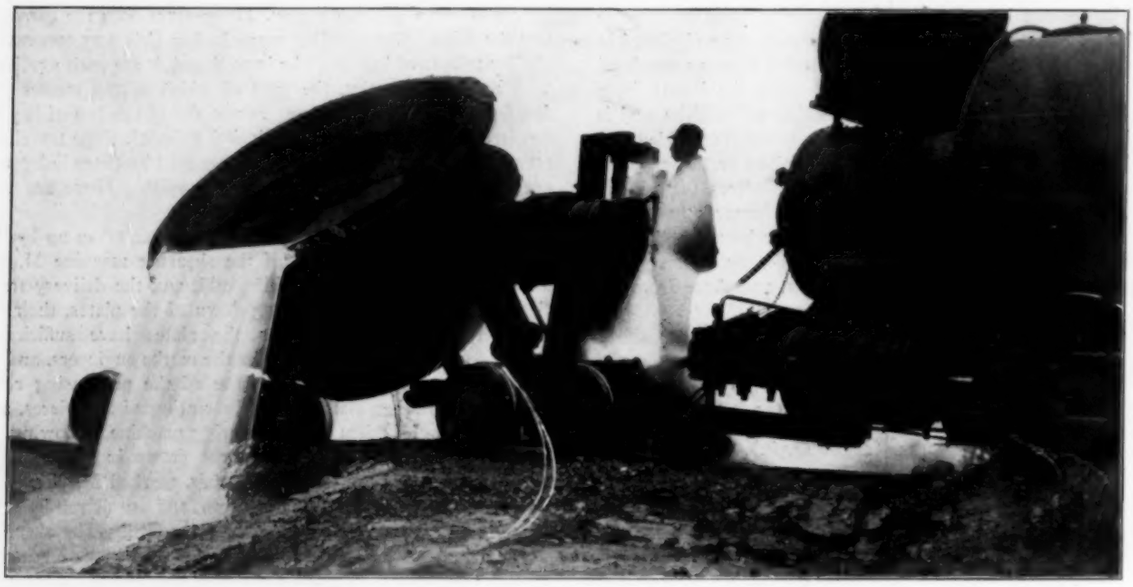


FIG. 1.—THE STEWART-EATON CINDER POT IN OPERATION.

As is better seen in Fig. 2, the dumping and cushioning cylinders are cast together, and there is a rack moving in a guide cast on one of the cylinders. The rack has an arm to which the piston rods are secured, and, on the raising or lowering of the rack, a gear wheel keyed on the trunnion of the pot is rotated to a corresponding extent, the limit to which the pot is usually tipped being 90 degrees. The air or steam is admitted or exhausted from the cylinder by a 4-way valve. When several of these cars are used, forming a train, the main steam or air-pipes are connected together, as shown in Fig. 1, so that a supply of steam from the boiler of the engine or other source may be applied to the entire train, and the pots dumped conveniently. A suitable valve is provided for the pipe connecting the two ends of the cushioning cylinder, so that the flow of liquid through the pipe, from one end of the cylinder to the other, may be regulated with precision.

When a crust has formed over the bottom of the slag pot, and it is necessary to break this up, steam or air is admitted into the upper end of the cylinder shown under the bail in Fig. 2. This forces the piston of the cylinder down, and,

by means of the connecting levers, pushes upward the steam passing through the bottom of the pot, raising the plate inside and thus breaking the crust formed over it. Then by turning the handle of the valve 90 degrees in the opposite direction, the upper end of the cylinder is opened to the exhaust, while steam or air is admitted to the other end, bringing the plate back to its normal position in the bottom of the pot.

Cleveland Machinery Market.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, June 3.

There has been some diminution in the number of orders for machine tools during the past month compared with May of last year and with the first months of this year. The dullness of the pig iron market and in some lines of finished product also reflect conditions which represent a check in the demand for machinery. The strikes pending or threatened are also believed to have had some influence in making buyers more cautious. Labor troubles in Cleveland have not, however, been as serious as in many other cities. About 100 machinists employed in four shops are holding out for a nine-hour day and 12½ percent increase in wages. A large number of brass workers are still on strike and and brick makers have been out for several weeks, causing the stopping of work on many new structures. With these exceptions, however, workingmen seem to be contented and there is little danger of serious trouble. The nine-hour day has been granted by a number of automobile manufacturers, all of whom are extremely busy at the present time.

The Balkwill Pattern Works has a large contract from the Wellman-Seaver-Morgan Co., and with the other work which it has on hand will be very busy for some time to come. Business has been excellent with this company for a number of months and it has nothing to complain of but the scarcity of pattern makers.

The Upson Nut Co. has made a number of additions during the past two years and believes that the time has come to stop extending, as indications to this company are that the tendency will be to a decreased demand for bolts and nuts.

The Elwell-Parker Electric Co. has been receiving orders in large numbers and is now crowded with work.

Bardons & Oliver, manufacturers of turret lathes, whose plant was destroyed by fire last winter, are now located in their new building recently leased on Water St., near the Union Depot. They have about doubled the floor space of the old plant and are installing considerable new machinery.

The Victor Electrical Co. is now occupying its new plant on Perkins Ave. It manufactures electrical supplies and does electrical repair work.

The Garry Iron & Steel Co. is introducing a new line of electric and pneumatic cranes, which are being received with much favor.

There are now about 20 concerns in Cleveland engaged in the manufacture of automobiles and automobile parts. The Winton Motor Carriage Co. turns out six large touring cars per day and will soon be able to manufacture a larger number, as a large machine shop is being erected. The Cleveland Automobile Co., which buys its parts, is turning out two cars per day. Over 500 automobiles have been delivered to purchasers in Cleveland this year.

The Cleveland Pneumatic Tool Co. reports that business has never been as good as at the present time. The company is getting a large foreign trade, which has resulted entirely from correspondence, as it never had representatives across the water. The home demand is constantly increasing. It has found it necessary to add a quantity of new machinery and employ more men in the shop, and yet it is unable to keep up with its orders.

The C. O. Bartlett & Snow Co. reports that inquiries have been increasing to a considerable extent during the last week. Among those received are the following: Elevating outfit for Egyptian Portland Cement Co., Detroit, Mich.; elevating outfit for Crouse Tremain Carbon Co.; complete set of crushing machinery for Detroit Portland Cement Co.; elevating machinery for Grasselli Chemical Co., Cleveland; two large cereal dryers for Molloy & Co., Port Huron, Mich.

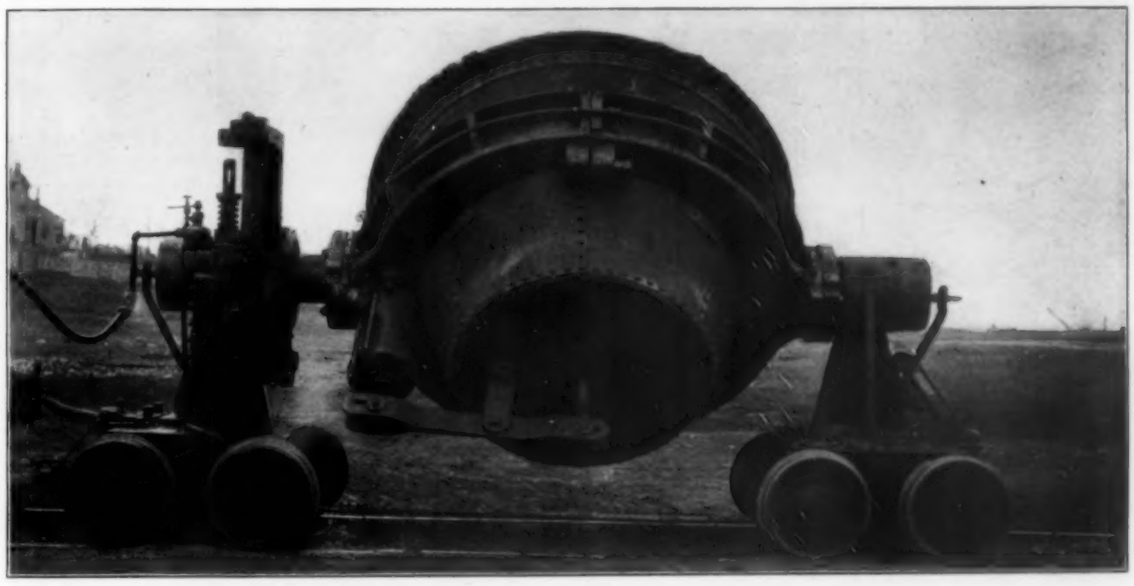


FIG. 2.—REAR VIEW OF STEWART-EATON CINDER POT.

The Electric Controller & Supply Co. reports that business is increasing and that it is now filling several large orders for prominent concerns.

The Chisholm & Moore Mfg. Co. finds business good and it is busy in all departments. Some very desirable contracts for malleable iron castings have been closed recently.

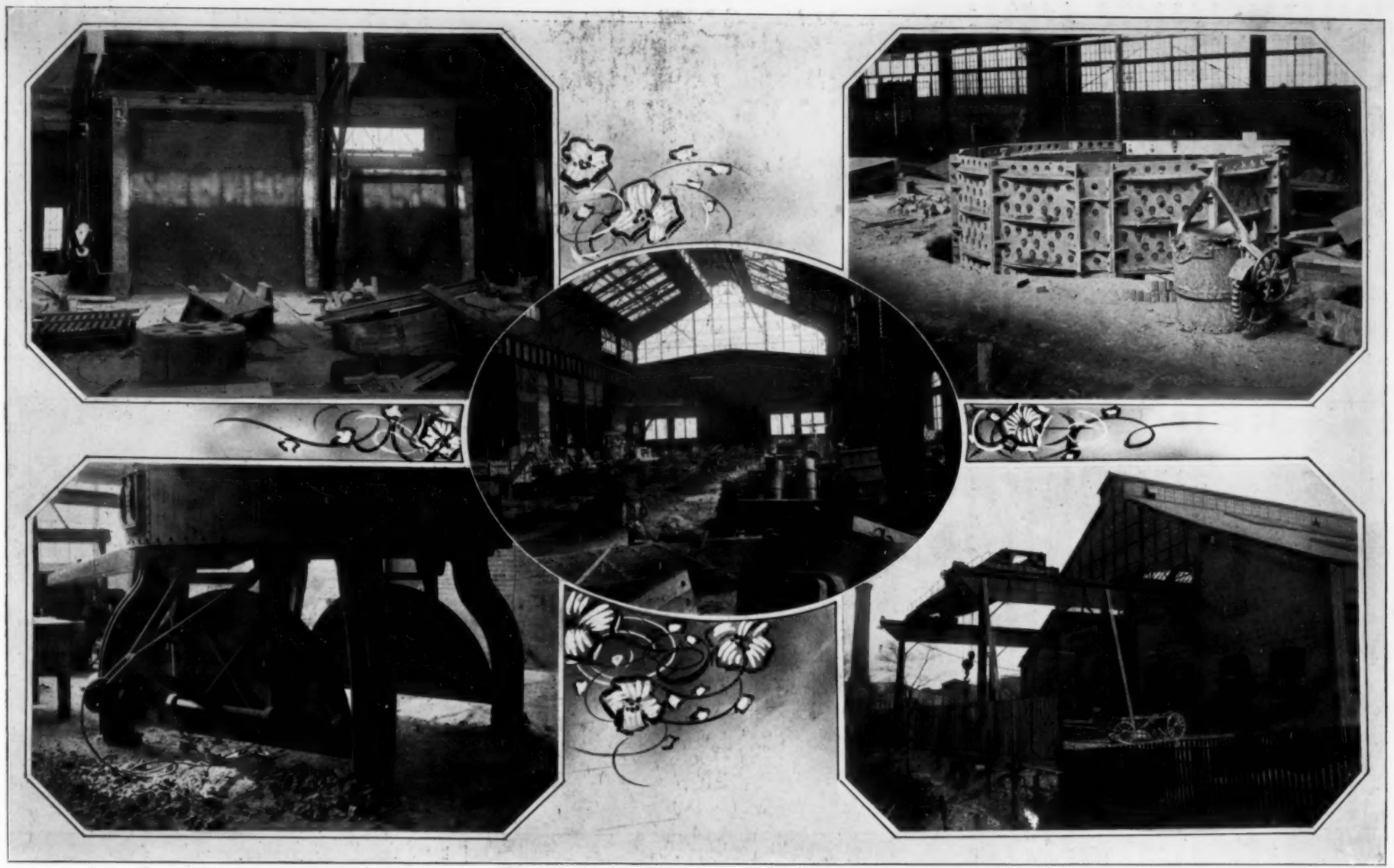
The Standard Motive Power Co., which is erecting a large plant at Canal Dover, O., for the manufacture of locomotives, has obtained figures from Cleveland dealers for a considerable number of machine tools.

The Ajax Mfg. Co., whose plant was visited by fire several months ago, is now operating its machine shop, and is extremely busy endeavoring to catch up with orders.

F. H. Bultman & Co., manufacturers of gear cutting machinery and gears, now have two floors, 30x100 feet, nearly doubling their former capacity, in the Viaduct Power building. They have installed a large number of new tools.

The Loew Filter & Mfg. Co. is erecting a new plant on West Madison Ave. The main building will be 60x413 feet and two stories high. A considerable amount of new machinery will be installed and will be electrically driven. The company manufactures bottling machinery and brewers' supplies.

Foote, Burt & Co. report a steady flow of orders. They are trying to fill a few urgent orders for July delivery, which have just come in, but in doing this will be compelled to delay until August the delivery of some machines which they had intended to deliver in July.



CORE OVENS WITH STEEL ROLLING SHUTTERS.
ARRANGEMENT FOR CLOSING HEAVY CUPOLA DOORS.

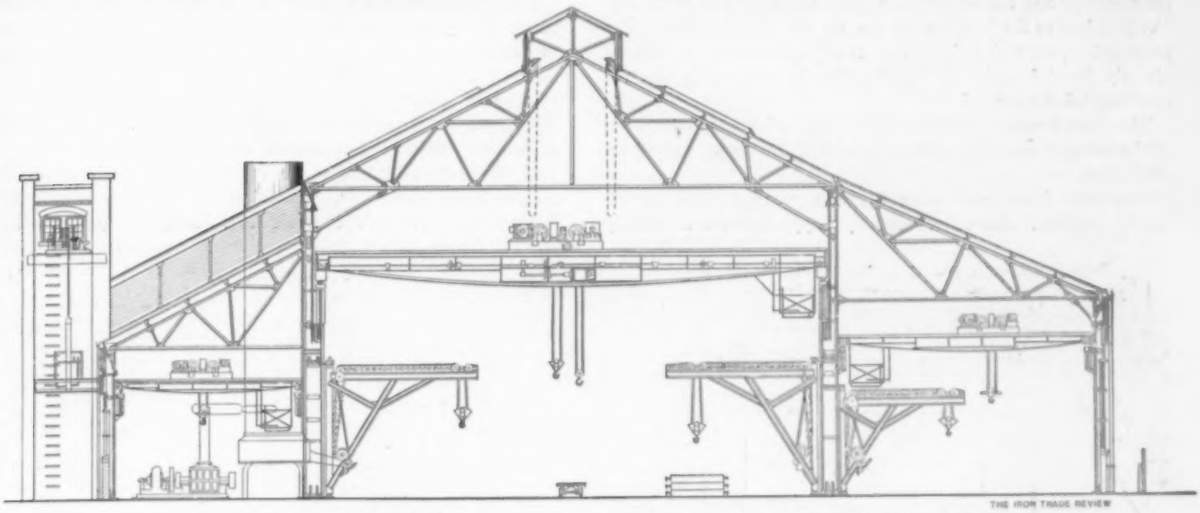
INTERIOR OF FOUNDRY.

SYSTEM OF CURBING EMPLOYED ON LARGE LOAM MOLDS.
50-FOOT EXTENSION OF CRANEWAYS OVER LOADING TRACKS.

VIEWS OF THE NEW HEAVY WORK FOUNDRY OF THE INTERSTATE FOUNDRY CO., CLEVELAND.

The Interstate Foundry Company's New Plant for Heavy Work.

Among foundries of recent construction erected with a view of turning out the heavier class of castings is the new plant of the Interstate Foundry Co., Cleveland, O., which company has also another large foundry devoted to light castings exclusively. The buildings were designed and erected under the supervision of Kaltenbach & Griess, consulting engineers, Cleveland. The present description refers exclusively to the new plant for the manufacture of heavy castings, the other department having already received attention in the columns of *The Iron Trade Review*.



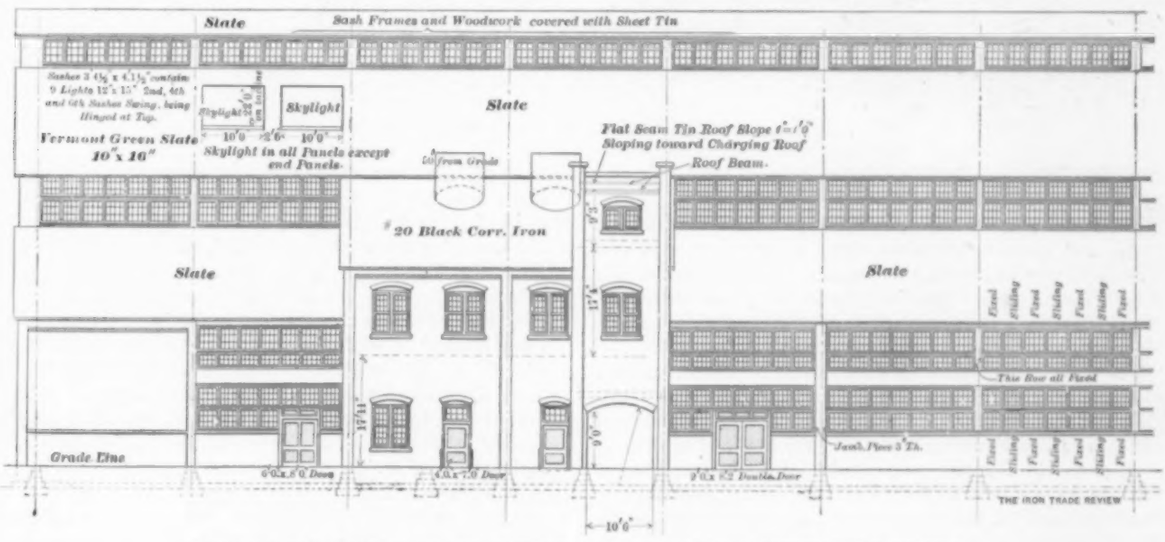
CROSS-SECTION OF THE HEAVY CASTING DEPARTMENT OF THE INTERSTATE FOUNDRY CO.

The building is of steel frame construction, with a slate roof, the slate being laid on heavy wooden sheathing. The side walls are carried six feet above the grade line, having a sill line running all around the building. The construction from the sill line to the eaves of the roof is in panels of sliding sash fitted with clear common glass, giving the maximum amount of light and ventilation. All other curtain and end walls, also walls in the elevator tower are of brick masonry.

The building in the main cross section consists of a main aisle 80 feet wide, lean-to on the south 40 feet wide, and a lean-to on the north 30 feet wide. The height of the crane runway in the main aisle is 32 feet from the foundry grade, and on this runway there is at present in operation one 40-ton and one 25-ton four-motor electric traveling crane. The 40-ton crane is fitted with a 10-ton auxiliary hoist, and the 25-ton with a 5-ton auxiliary hoist. The two lean-tos are each equipped with two five-ton three-motor travelers. All the cranes are furnished by the Shaw Electric Crane Co., of Muskegon, Mich.

The present building is 300 feet long, and provision is made for future extension in an easterly direction of 300 additional feet. The north lean-to is interrupted by the cupola room and charging floor, which is 50 feet long and 30 feet wide, the east wall being located 50 feet from the present east end of the foundry. This location will bring the cupolas near the center of the foundry when the building is extended in the future.

The main crane runway is extended 50 feet on the outside at each end of the building, and the loading track for the material runs directly under this crane runway. The loading track has no connection with the supply track, so that there is never any interference or shifting of cars required for castings shipped and material received. The crane runway at the



ELEVATION OF A PORTION OF THE FOUNDRY SHOWING PRINCIPAL CONSTRUCTION DETAILS.

There are two cupolas as present in place, and provision is made for two additional cupolas. One cupola is a Byram, 86 inches outside diameter, and one a Whiting, 104 inches outside diameter. The total height from base to stack is 70

feet. The cupolas are supplied with blast from two Root's blowers, direct connected with a General Electric Co.'s 230-volt motor. The drop doors on the cupolas are fitted with special attachments for raising the doors, consisting of forged levers, with sheaves, mounted in the ends and connected with wire rope passing to a hand winch.

The elevator is mounted in a tower which can only be entered on the ground floor from the outside. The elevator hoist is furnished by the Otis Elevator Co. and is fitted with a 35-h. p. 230-volt direct current motor. The elevator has a capacity of ten tons and is arranged for two buggies. A special feature in connection with this elevator is the fact that the scale for weighing this material is framed directly in the platform and the weights are noted after the load is hoisted and just before the buggies are run on the charging floor. The proposed system for handling this material is to charge directly from buggies to cupola, thereby preventing the re-handling of the material.

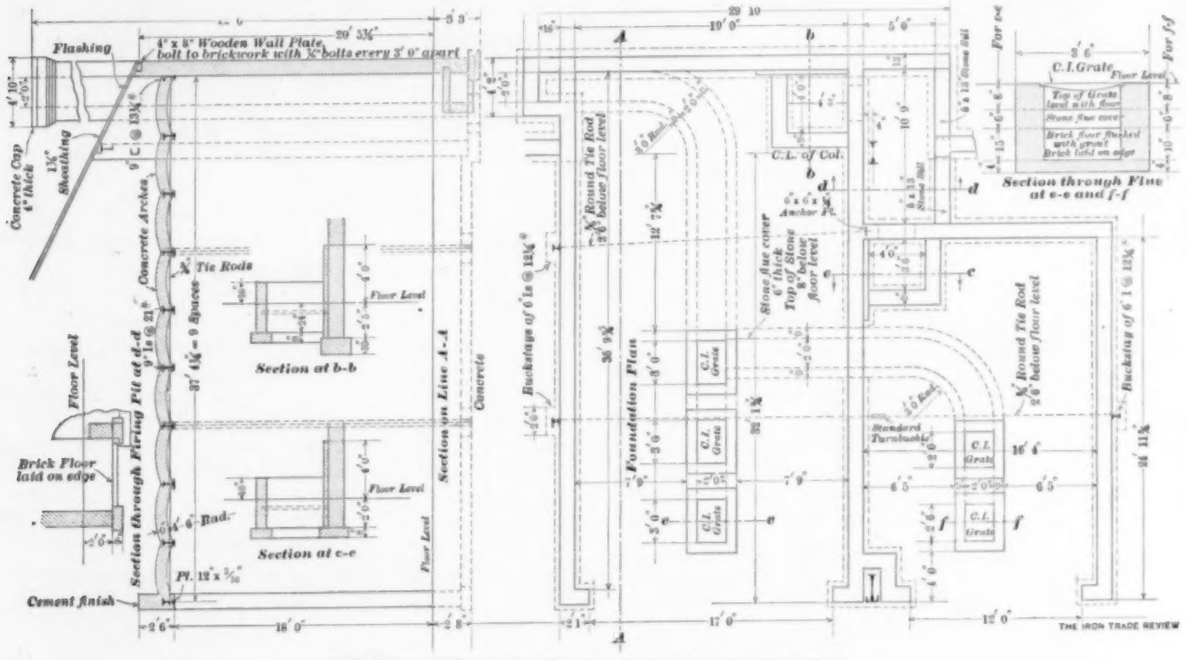
The core ovens are located just east of the cupola room in the lean-to, and are fitted with rolling lift doors, and down draft flues.

The top of the core oven forms a storage platform for facing material and other foundry supplies, with a balcony

CONSOLIDATED LAKE SUPERIOR CO.

Cornelius Shields, president of the Consolidated Lake Superior Co., has made the following statement: "In the manufacture of steel rails at the 'Soo' which will be started, as I expected, right at the beginning of July, we will this year use 80 percent of ore from the Mesabi district and 20 percent of the ore from the Helen mine. This mixture of ore will enable us to turn out a rail equal to any manufactured in any place in the world. Two of the blowing furnaces are now completed and the machinery for two others is already on the ground, ready to be installed. By next year we will have made arrangements to secure ore from our properties in Minnesota, which is practically a duplicate to be found in the Vermillion range. They will enable us to dispose of an increase quantity of the ore from the Helen mine, for which there is a strong demand throughout the United States. This year we will dispose of close to 500,000 tons to different manufacturers, shipping it as far even as Virginia. The demand has been so great that we have been obliged to refuse orders."

F. H. Clergue has made the statement that he is to remain at the Sault under Mr. Shields' administration. Since Mr. Shields' arrival at the Sault Mr. Clergue's position has


Flashing
4" x 8" Wooden Wall Plate, bolt to brickwork with ⅝" bolts every 3' 0" apart
Concrete Cap 4" thick
1¾" Sheathing
Concrete Arches
Tie Rods
Floor Level
Section at b-b
Brick Floor laid on edge
Section through Firing Pit at d-d
Section at c-c
Cement finish
Section on Line A-A
Concrete
Buckstays of 6 I @ 12¾"
Foundation Plan
Round Tie Rod ⅞" below floor level
C.L. of Col.
Anchor Pl.
Stone flue cover 6" thick Top of Stone 8" below floor level
C.I. Grate
Standard Turnbuckle
Section through Flue at e-e and f-f
C.I. Grate Floor Level
Top of Grate level with floor
Stone flue cover
Brick floor flushed with grate
Brick laid on edge
THE IRON TRADE REVIEW

SECTIONAL VIEWS, ILLUSTRATING CORE OVEN CONSTRUCTION.

extending into the main aisles so that material can be handled by the cranes in the main aisle.

The building is arranged with a large lift door with steel frame, and covered with sheet metal, which when open permits the cranes to pass in and out of the building on the runway. This lift door is practically balanced by counterweights, and is raised by a cable attached to the crane, which when running along the runway will lift the door and *vice versa.*

The gables are fitted with fixed sash throughout, and the roof has skylights of liberal dimensions, fitted with wire ribbed glass and copper curbs. All valleys are are fitted with copper gutters and details throughout are of the best and up-to-date, as required in foundry construction. Special attention has been given throughout to the proper facilities for light and ventilation, which is important to secure the best results in foundry work.

All the lighting circuits are operated on 110 volts, and all motors on 230 volts. The power is supplied from the old power house at the light casting plant, where a new installation consists of a 500-h. p. tandem compound direct connected unit. The engine is of the Buffalo Forge Co.'s manufacture, and the generator is a Westinghouse 125 and 250 volt machine. The motor and lighting circuits are separate, and all motor circuits are fitted with automatic cut-outs.

The capacity of the heavy castings plant is steadily increasing, and it will soon reach an output of 125 to 150 tons per day.

changed. He says: "Hereafter I am merely a critical director of the company living at the Sault, where I may overlook the work, give advice and ask why this costs so much and why that is not making more money. I think it is a good thing for a director to live on the spot where such large enterprises are being conducted. As one of the heavy stockholders in the company I am naturally anxious that it should do its best and as I am familiar with all the departments from my association with the enterprises, I may perhaps be in a better position than those directors who live in Boston or New York or Philadelphia to give advice and assist in the working out of the plans already laid down, and which will be pushed forward as rapidly as possible."

Charles M. Schwab and Judge E. H. Gary have been elected directors of the American Steel Foundries Co., filling vacancies caused by the resignation of H. K. Wood and K. K. McLaren. The retiring directors were representatives of the Corporation Trust Co., of New Jersey. They filled the offices temporarily. The directors declared the regular quarterly dividend of 1½ percent on the preferred stock. Judge Gary and Charles M. Schwab have been interested in American Steel Foundries for some time past. A large amount of the stock is owned by interests identified with the Steel Corporation. It is stated officially that the company's earnings are at the rate of 6 percent on the preferred stock and between 6 and 7 percent on the common stock.

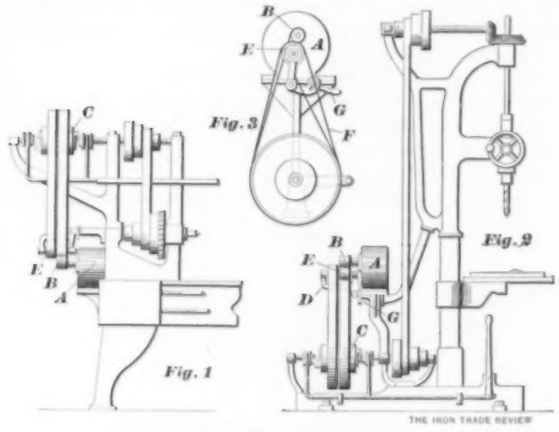
Some New Things for the Shop, Chiefly by Way of the Patent Office.

A Reversible Driving Mechanism.

The system illustrated has been designed for driving metal working tools or similar machines from electric motors, and is the invention of Frank T. Currier, of Worcester, Mass. The principal object of the invention is to provide a strong and simple construction in which the motor will be supported in a comparatively low and accessible position, where the motor vibration will not interfere with the work, while the power of the motor will be transmitted to the machine in a direct manner and the machine may be reversed without reversing the motor.

Fig. 1 shows the application of the invention to an engine lathe ; Fig. 2 illustrates the attachment of a motor to a drill press, and Fig. 3 is an end view of the driving mechanism.

The patentee points out that in the customary method of applying electric motors to drive machine tools they are so connected that in order to reverse the machines the motors themselves must be driven in the opposite direction, the repeated reversals of the motor having injurious effects. The usual method of motor attachment is also claimed to result in vibrations which are apt to produce bad work. The elevation of the motor, as indicated by the engravings, is said to be where the vibration will not so affect the work of the ma-



AN ELECTRIC DRIVE FOR MACHINE TOOLS.

chine. The reversal of the drive is obtained by means of a tightening and reversing pulley, which serves the double purpose of tensioning the main driving belt of the electric motor, and of turning the driving shaft in the reverse direction, when this is desired.

There are brackets extending upward from the headstock, shown in Fig. 1 and on these are placed the cone shaft and pulleys. The motor A is supported on a shelf at the end of the lathe bed. The driving connections are similar in each case, the arrangement being inverted in Fig. 2 from that illustrated in Fig. 1 ; but the connections are otherwise practically identical, and the reference letters apply equally well to the drill press or the lathe. There is a pulley B on the motor shaft which is connected by a main driving belt to turn a loose pulley C on the shaft. The pulley C is provided with the ordinary friction clutch mechanism which may be thrown into action by the shipper rod when the loose pulley is to be connected to the counter-shaft.

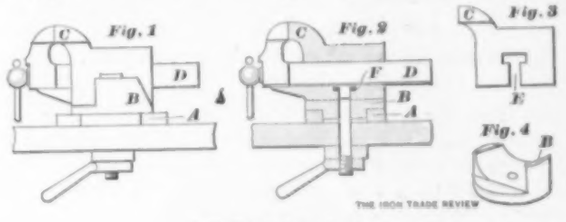
There is an adjustable bracket or sweep D having a stud carrying a tightening and reversing pulley. The smaller section of this pulley runs in contact with the outside of the main driving belt and the other half of the same pulley has a driving belt which drives the second loose pulley on the shaft. The stepped cone E is thus driven in either direction and at a velocity in proportion to the relative diameters of the reversing and other pulleys. For instance, the motor A may be connected to drive the drill spindle through the main belt, the tension of the driving belt being regulated by setting the sweep D to the desired position by means of a handle *G*. The latter is held in place by a nut.

The inventor also shows a positive gearing to supplement the frictional action of the tightening and reversing pulley. The two sections of the reversing pulley are then independent, the outer one having a hub extending through the other pulley with a gear on the end meshing with one on the armature shaft. In other respects the arrangement of the parts is identical with those already described.

A Vise Improvement.

New designs for vises, either of the hand, bench or machine type, are common enough. They come along with the same regularity with which they follow the ruts marked out by preceding inventors. The general scheme is for something different in the way of a fastening for the jaws, locking the vise at any point in the rotation about the center of attachment to the bench, etc., or some method of tilting the device. The latter is the object of the invention under consideration, but the patentee, Edwin W. Fulton, of Watertown, N. Y., proposes a form of vise which admits of a rugged construction as well as a convenient arrangement. One jaw of the vise has a round shank which is cored out for the sliding jaw. The shank rests in a concaved casting and is held by a sliding bolt in a T-slot.

The vise is shown in Fig. 1. Fig. 2 is a sectional view taken through the vise and the supporting swivel plate. A side



A HANDY BENCH VISE.

elevation of one of the jaws, Fig. 3, shows the peculiar shank. A perspective view of the swivel plate is shown in Fig. 4, the plate having the upper surface concaved out to receive the cylindrical shank of the jaw illustrated in Fig. 3.

The plate A is fastened to the bench by means of screws and there is an opening in the plate to fit the shoulder of the swivel plate B. There is a bolt hole through B which registers with a similar opening in the bench.

One of the vise jaws is designated by C and has a hollow shank. The opening through the shank in the present instance has the inner wall fitted to the square shank of the sliding jaw D.

The rounded shank of the jaw C has a curved slot extending about one-half of the circumference, one end of the slot being recessed laterally so that the T-head of the bench bolt may be easily inserted through the widened part of the slot when putting the vise together. The rounded jaw shank rests in the concaved plate B and the vise may be rotated to right or left, the movement in opposite direction being only limited by the jaw coming in contact with the flat portion of the plate B.

The head of the bench bolt is concaved at the end and rounded underneath each side to fit the curved surfaces of the T-slot, and being securely held by the hole in the concave plate there is no chance for the bolt to cramp when rotating the vise from one position to another.

The inventor has worked out the design for a patternmaker's vise, for drill presses, etc. The ability to tilt the jaws in line with a vertical or sloping shaft or length of pipe would have been of great convenience in many a threading, tapping and chipping job that the mechanic can remember only too well.

A Multiple Spindle Milling Machine.

Samuel R. Boyer, formerly of Cleveland, now of Harrisburg, Pa., has patented an attachment for milling machines, the device being adapted to the millers now in use and having means to drive several cutters simultaneously. The cutters are removable in their spindles which in turn are mounted in a turret so that the plane containing the spindle axes may approach or recede from the horizontal—a provision which permits the cutting of a section and finishing the job in one passage of the work through the machine. The single setting of the work materially cuts down the cost as well as ensures greater uniformity in the product.

The invention has other points of note. There is a dustproof casing for the driving mechanism, which may be opened for the inspection of the gearing. The gear wheels can be readily removed for the purpose of changing the relative

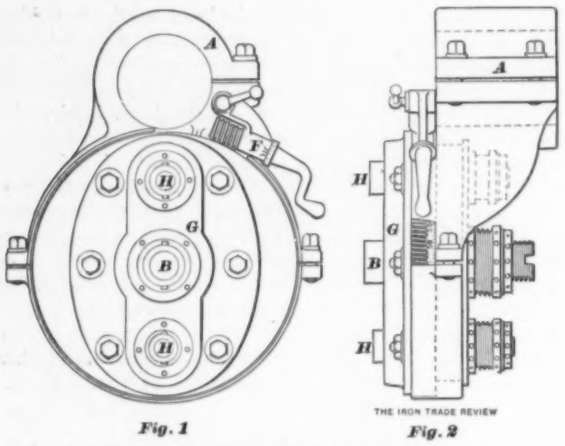


Fig. 1 *Fig. 2*

THREE-SPINDLE TURRET FOR MILLING MACHINE.

speed of the cutters. The problem of alignment, take up for wear, etc., has also received attention in the design. Figs. 1 and 2 represent the front and side elevations of the complete device, and Fig. 3 is a sectional view of the turret. The device is clamped to a milling machine by fastening the bracket A to the overhanging arm. The central or main spindle of the device B is driven by the spindle of the machine to which the turret is attached, by means of the taper arbor C. The taper arbor C being fastened to the spindle of the device by a locking cap shown in Fig. 3.

Each of the three spindles is longitudinally adjustable, independently of the other. The adjustment is made by screwing the rear bearing in or out of the turret housing as the

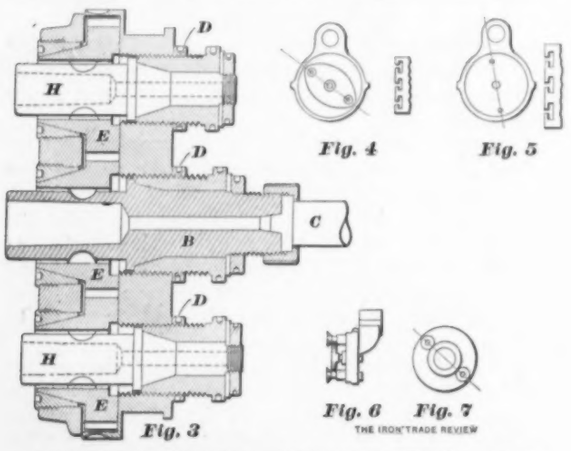


Fig. 3 *Fig. 4* *Fig. 5* *Fig. 6* *Fig. 7*

THREE-SPINDLE MILLING ATTACHMENT IN SECTION AND AS APPLIED TO THE CUTTING OF T-SLOTS AND DOVETAILS.

work may require and then locking the spindle in place by the check nut D shown on the rear bearings in Fig. 3. The small spindles H are driven from the main spindle by the gears E.

Fig. 2 shows part of the supporting bracket cut away in order to expose the graduation as well as the gashing for the worm ; the purpose of the former is to be used as a reference in the oblique adjustment of the turret, the latter to make minute adjustments of the turret when milling to gauge, by means of the worm F which is "micrometered" to minutes.

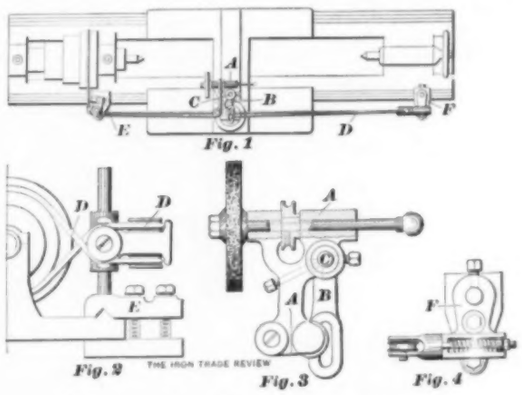
Figs. 4 and 5 show the attachment at work cutting three T-slots. Fig. 4 illustrating the position of the turret when the T-slots are close together and Fig. 5 when the slots are further apart. The mere rotation of the turret is sufficient to obtain a considerable variation in the distance between slots. Figs. 6 and 7 show the device at work cutting dovetails, finishing the several surfaces at the one cut. Various forms of dovetails, T-slots, grooves, tenons, etc., can be worked out in similar fashion. Obviously the same cutters may be used in many cases for milling parts to fit together, a slight rotation of the turret giving the necessary play in the finished piece and the same method compensating for the wear, reduction of size by grinding the cutters. The cutters for these different purposes may be of various sizes and this necessitates proportionate speeds. The device is therefore provided with means to insert change gears when the central cutter is larger or smaller than the others. The contrivance is evidently more useful for factory than jobbing purposes.

A Lathe Attachment.

An adjustable grinding attachment for lathes has been patented by Albert R. Grever, of Pensauken, N. J., and Clarence Stone, of Philadelphia. It is intended for attachment to lathes of different sizes, to be capable of movement lengthwise and across the lathe bed and also having an angular adjustment to meet various requirements, including the grinding of lathe centers.

Fig. 1 is a plan view of the attachment as applied to a lathe. Fig. 2 is an end elevation of one of the pulley stands. Fig. 3 is a plan view, partly in section, of the frame carrying the grinding wheel and adjuncts, and Fig 4 is a sectional view of one of the pulley stands.

There is a frame A with bearings supporting a shaft, hav-



RIGGING UP A LATHE FOR GRINDING.

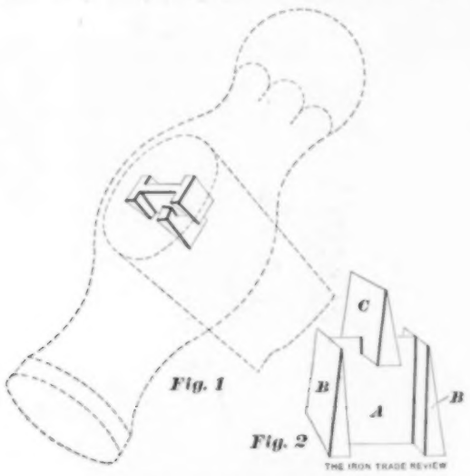
ing at one end a grinding wheel and at the other a knob by which the shaft may be moved back and forth through the bearings as desired. There is a pulley splined on this shaft and located between the two halves of the bearing in the frame A. This arrangement permits the longitudinal movement of the shaft without altering the position of the pulley. A bracket B is secured to the lathe carriage and rising from this bracket is a post C having a collar, which may be fastened by a setscrew. A frame rests upon this collar, and may be set and fastened at any angle to suit the work in hand. The belt D drives the shaft in the frame A, the belt passing around the sheaves on the pulley stands E and F. The method in which the pulley stands are arranged on the bed and clamped in position is clearly shown by the engravings. The grinding wheel is moved endwise of the lathe while the driving belt remains taut, as is obvious from the arrangement of the pulleys. The motion of the grinding wheel frame across the lathe bed is a different proposition, and for this purpose the pulley on the stand F (see the sectional view in Fig. 4) has a yielding connection. The pulley is mounted on a stem

which slides in the frame and is normally retracted by a spring interposed between the frame and a collar on the stem.

A Tool-Handle Wedge.

Fastening a handle on a tool so that it will stay where it has been put has difficulties that the initiated will understand. Just now it is a matter of securing the handle of a hammer, and many a man has gone off the handle, so to speak, at an unexpected divorce between the two. A long thin wedge of wood or metal, nicely fitting a nick in the shaft end, the wood wedge touched with a little glue, and if the shaft and hammer head were of appropriate kind and shape, the result was likely to be satisfactory. Oliver Weston, of Cleveland, proposes to go this construction one better and make a sure thing wedge ; one that will not come out and will, by its peculiar shape, hold the tool firmly to the handle. He intends to obtain this result by the wedge shown in Figs. 1 and 2, the former being a perspective view of the wedge applied to a hammer handle, and the other illustration is an enlarged view of the device.

The invention is a combination of wedges in one piece, A being the main or basic wedge, on each side having at right

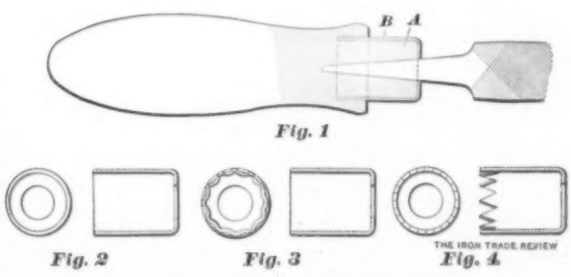


FASTENING A HAMMER HEAD.

angles a wedge B. The junction is at the middle of the wedges B so that they project laterally both ways from the wedge A. The wedges, A and B, are about the same length and the bases and points are flush as shown. At the middle of the point of the wedge A is joined at a right angle the base of a fore wedge C and the base of this wedge stands out from each face of the wedge A, forming shoulders. But the shape of the wedge, as a whole, is fairly clear from the figures and it will be understood that the fibres of the wood after passing the wedge C contract behind the shoulders, the action being assisted by the inner faces of the wedges B, which keep the fibres from spreading, and this, as the inventor avers, "holds the wedge in the handle and the spreading action thereof binds the handle in the tool."

Another Tool-Handle.

The attachment of a handle to a file is also a matter which has worried many workmen. File tangs have been respectively threaded, clamped and pinned in place, the pointed end of the tang being decidedly dangerous when it was not in the handle to stay. The recent invention of Eli E. Hendrick, of Car-



A FILE HANDLE AND FERRULE.

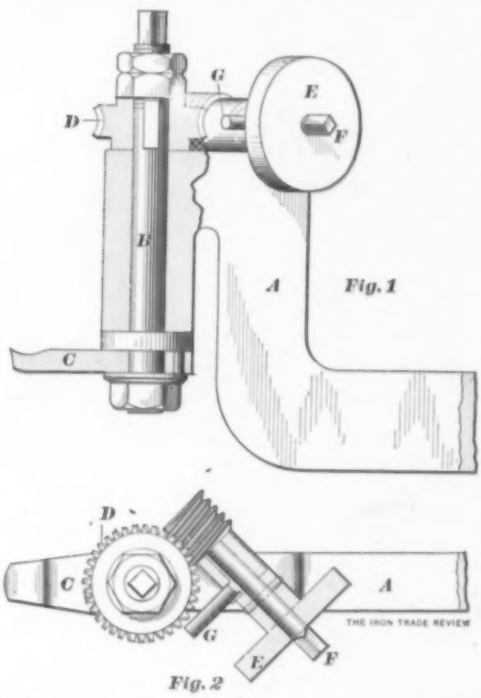
bondale, Pa., fastens the file by a suitable form and combination of ferrule and handle. In one form of the invention the ferrule is corrugated near the open end and may be toothed or serrated to easily penetrate into the structure of the handle as well as to guard against the ferrule turning on the handle while in use. The inventor states that he has found that by employing a ferrule the open end of which is unsharpened, the liability of splitting the handle is decreased.

Fig. 1 is a longitudinal section of a tool handle embodying the invention, and Figs. 2, 3 and 4 are views of the ferrule detached from the handle. The handle has a tenon A which is preferably in one piece with the rest of the handle. The ferrule B is driven on the tenon so that the open end penetrates into the shoulder of the handle until the end of the ferrule comes into contact with the end of the tenon. The coaction between the handle and the ferrule is thus a very intimate one and the subsequent shrinking of the wood is not so likely to loosen the grip of the one part on the other, as may happen with another construction. But is this use of a long ferrule with a blunt edge "broadly novel?" Has no workman hitherto forced a plain ferrule, somewhat longer than the tenon, into the shoulder of the handle, so that the ends of both came up solid ?

Fillet Cutting Tool for Lathes.

This tool has been designed for the turning of fillets or pounded grooves and is the invention of Emil H. and Robert G. Rabinger, of Philadelphia. Fig. 1 is a side elevation, partly in section, of a lathe turning tool and Fig. 2 is a plan view of the same. A is the holder, having a shank for clamping in the tool post and ending in a gooseneck with a bearing for a vertical shaft B. This shaft has a collar at the bottom end resting against the under side of the gooseneck and serving as a seat for the cutting tool C. The tool C is perforated for the passage of the shaft B and is held in contact with the collar by means of a nut.

There is a pin at the back of the cutting tool C which locks the tool, collar and shaft together. The tool can, of course,



LATHE TOOL FOR TURNING GROOVES OF CIRCULAR SECTION.

be held from turning independently of the shaft by being made with a square hole, etc. A worm wheel D on the upper end of the shaft B meshes with a worm having a bearing in an eccentric sleeve mounted in a projection on top of the gooseneck. The eccentric sleeve has an arm G which plays in a slot so that when in one extreme position of adjustment the worm and gear will mesh and the tool may be rotated by turning the disc E. When the sleeve is in the other position of adjustment, the worm is out of mesh and the shaft C can

be turned independently by means of a wrench applied to the upper end.

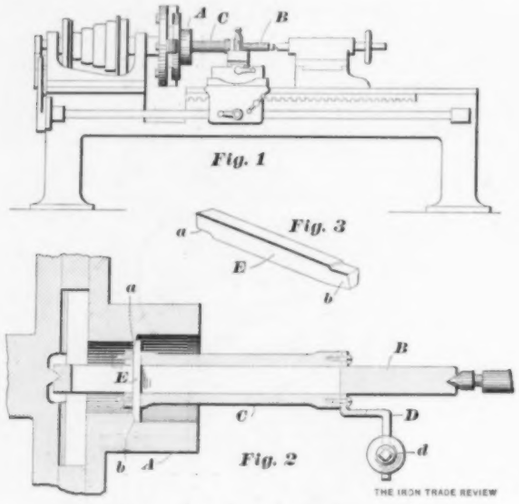
The shaft projects beyond the disc E and is squared as at F for the reception of a wrench should this amount of force be necessary. The disc E is knurled as shown and ordinarily this will be sufficient.

The length of tool can be changed to correspond with the radius of the curve to be cut.

Boring Tool.

George R. Rich, of Chicago, has evidently had some experience with boring jobs worked out on engine lathes, and does not favor the nibbling away of material if a good businesslike bite is to be had. In fact he states specifically that "the object of my invention is primarily to produce a tool which shall have no tendency to break whatever the size of the shaving is, and which shall be capable of taking so large a shaving that under ordinary circumstances only one operation will be necessary."

Fig. 1 is an elevation of a lathe with the new boring tool in place; Fig. 2 is a section along the line of centers in Fig. 1, showing the construction of the boring tool and its position relative to the chuck, tailstock, and work. Fig. 3 is a perspective view of the cutting bar or tool proper. A is the work ready for boring and the inventor asserts, as per the specifications, "as is customary in such cases, it is finished on the outside and suitably cored on the inside before the boring is begun." The cored holes *do* get ahead of the boring as a rule, but it is likely that there are quite a few shops where the boring is done before the pieces are turned on the outside. That is, in such cases where the two operations are not carried



A BORING TOOL AND ITS APPLICATION.

on simultaneously, as they might be in work of this kind. A shaft B extends from the live center to the dead center, and has a long slot cut through it to within a short distance of the ends. A sleeve C is mounted on B and has an arm which can be fastened in the toolpost. At the end of the sleeve C nearest to the chuck, are two holes D in line with each other, for the reception of the cutting tool.

The cutter is made, as in Fig. 3, and has cutting edges *a* and *b* at both ends of the tool. One edge is tapered off as at *b* so that when in operation that end will take off a slightly thinner shaving than the cutting edge *a*. The cutter is not placed centrally, but the end *b* is further out than *a*, as shown in Fig. 2. The intent being that the one end shall cut quite a thick shaving, but of a small radial extent, while the other end takes off a thinner shaving, but of a greater radial extent.

The inventor claims, in this way, to have taken off a cut 7/8 of an inch broad with a tool of this kind upon an ordinary lathe. The tool may be employed for the cutting of tapers. The tailstock may be moved to one side or the other and a sleeve, fitting over the arm on C, clamped in the toolpost, so that a slight angular movement may be obtained between the toolpost and the boring rig.

So long as the patent papers show the device sufficiently clear for an expert to understand the contrivance, they fill the requirements. The critical may find something of interest, nevertheless, in the way this invention is set forth by the draftsman. The live center is shown as in one piece with the chuck albeit cast iron centers are not altogether satisfactory for such work, there is an unusual extension of the tailstock screw, the gears at each end of the cone in the headstock are large. There are other points of interest, of course. The bed is in one piece, with the legs, and there is some uncertainty of stroke about the drawing of the feed belt, but these are of minor import, and, like the rest, do no injury to the value of the patent.

THE LARGEST REAMER.

The illustration shows what is in all probability the largest adjustable reamer so far built. The tool was made by F. B. McCrosky, of Cincinnati, for the Bullock Electric Mfg. Co. The cutting diameter is 16 inches with an adjustment of 1/4-inch. There are 34 blades made of 1/4-inch by 1 5/8-inch steel, and these blades rest in slots, the bottoms of which are

SOMETHING OF A REAMER.

inclined planes. The cutters are held in place and adjusted uniformly by means of collars. The total weight is about 300 pounds, and the construction is substantially the same as the line of adjustable reamers made by this manufacturer. It may be well to add, however, that the man with the reamer in the picture is not Mr. McCrosky.

The Hanging Rock Region.

IRONTON, O., June 1.—Hecla furnace of the Hecla Charcoal Iron Co., is expected to resume this week after a shutdown of some weeks to secure stock.

Negotiations are now pending looking to a settlement of the labor troubles at Ashland, Ky., which will allow a resumption of the mills there and in Ironton.

Jefferson furnace, near Oak Hill, Jackson county, will go in blast again this week, after an idleness of several months. Centre furnace, this county, will resume about the middle of June. These two furnaces, with Vesuvius, Olive, Bloom and Hecla, are the only ones in Southern Ohio now making charcoal iron.

Capt. Enos B. Moore, late manager of the Portsmouth Foundry & Machine Co., died of paralysis last week at Ports-

mouth, aged 80 years. He had been in the foundry business in this section for twenty years.

William Fowler, of the Burgess mill at Portsmouth, has resigned to accept a position as superintendent of Grone's rolling mill in New York.

The loss on the plant of the Ironton Tack Co., recently destroyed by fire, has been adjusted, the company being paid $12,000. It is not likely that the plant will be rebuilt, at least by the former owners.

The situation along the line of the Norfolk & Western seems ripe for another strike of the coal miners. The operators declare they will fight it out, and several of the companies have mounted gatling guns at their collieries to prevent destruction of property. A strike now would seriously impede the opening up of many new coking operations, now under way, and again curtail the supply of coke for the iron industries of this region.

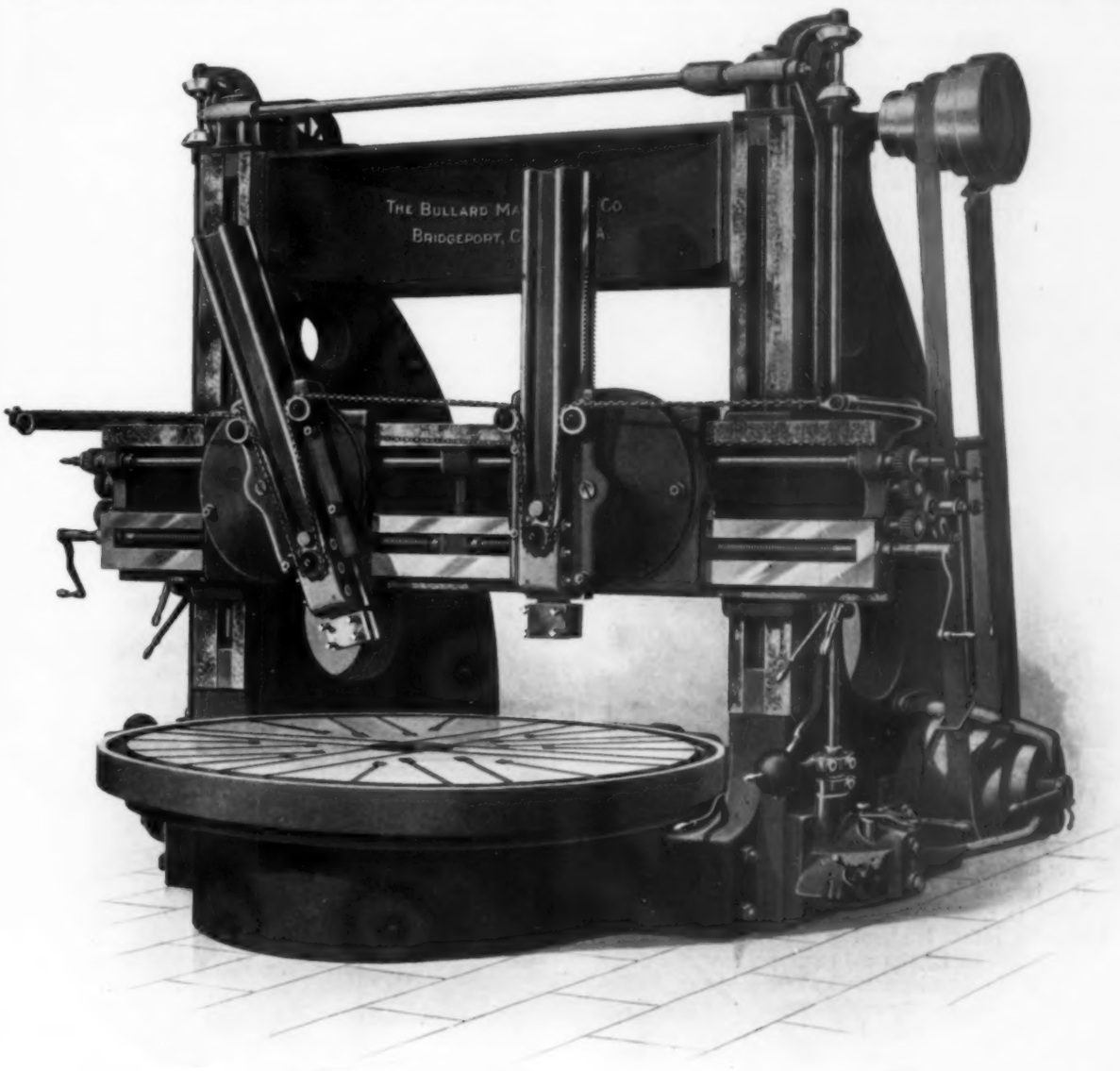
The Northern Coke & Coal Co. has recently paid $2,000,000 for coal lands in Floyd, Knott, Letcher and Pike counties, Kentucky, and will soon begin development on an extensive scale. The territory is tributary to the local market and is expected to add to its industrial strength in the next few years.

The stockholders of the South Baltimore Car Works, the Ryan & McDonald Mfg. Co., and the South Baltimore Foundry, have formally ratified the consolidation of the three companies under the name of the South Baltimore Steel Car & Foundry Co., with a capital stock of $1,000,000.

120-INCH BORING MILL.

The Bullard Machine Tool Co., Bridgeport, Conn., has designed and built a heavy boring mill to meet the special requirements demanded by the recent developments in high speed steels. The mill is nominally 120 inches, but the actual swing is 123 inches, and the height under the rail 84 inches. The table is 92 inches in diameter, the spindle 20 and 14 inches diameter and 60 inches long over all. The spindle support is 50 inches diameter, the approximate weight of table and spindle being 9 tons. All the gears are either cut or planed, and the net weight of the machine is 90,000 pounds.

The machine is readily adapted to belt or motor drive and a 20-h. p. motor is required for driving the same. The rail is 28 inches wide and has a bearing on uprights 36 inches long.



THE BULLARD 10-FOOT BORING MILL.

The face of the upright is 14 inches wide. The movement of the vertical tool bar is 48 inches and the heads are handled by power for quick traverse in all directions. The cross rail is raised and lowered by power. The driving cone has five sections, the largest being 30 inches in diameter, for four inch belt. The table gear ratio is 1 to 7. All feeds are automatic and range between 1-32 to 1 inch horizontal and 3-128 to ¾ inch vertically. All threads are cut from 1 to 12, including 11½. Fifteen changes of speed are available.

The floor space is 18 feet 4 inches by 12 feet 5 inches. The T-slots in the table incline toward the center, and have a drain pipe to carry away the lubricant, and the table itself is surrounded by an oil channel.

First Aid to the Injured in Metal-Working Plants.

The article in *The Iron Trade Review* for April 2 on "First Aid to the Injured in Metal-Working Plants," by no means exhausted all that could be said on so important a topic. A number of letters are given in this issue to demonstrate further the practice that has found favor in many establishments. The custom, as will be seen, is varied, the extent of the plant, the character of the work as well as the workers, the proximity or otherwise of hospital and other sources of surgical assistance, all having their influence upon the choice of a system and the subsequent equipment and management of an emergency surgical department.

Mesta Machine Co., Pittsburg.

The surgical department of the Mesta Machine Co., of Pittsburg, is illustrated in Figs. 1 and 2. The room, as shown, is 12x16 feet, is well lighted, has concrete floor, and is located on the ground floor of the office building. It is practically an emergency hospital. A full and complete line of roller bandages, Esmarch triangular bandages, splints, tourniquets, anesthetics, hypodermic syringe, needles, silk, etc., with Linton and iodoform gauze dressings are kept on hand to enable the surgeon to give the best possible care and attention to the injured person.

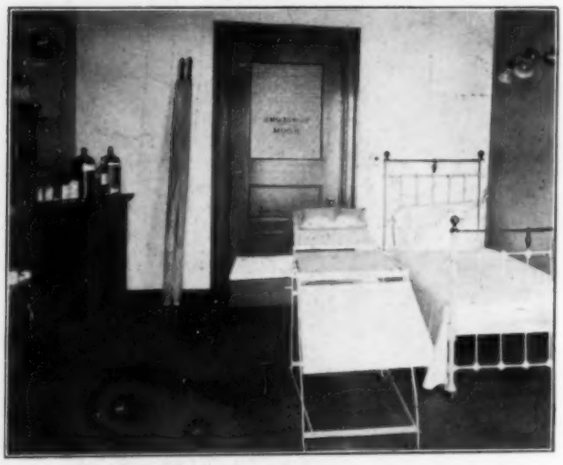


FIG. 1.—SURGEON'S ROOM AT THE MESTA PLANT.

When an employe is injured in any manner that he is unable to walk, the stretchers kept in various places in the works, are utilized and he is at once taken to this emergency hospital, where he is taken in charge by an employe who is proficient in rendering first aid. Pending the arrival of a surgeon the patient is placed in the best position necessary to attend to his injuries and temporary antiseptic dressings are used. In cleansing wounds of any kind only distilled water is used, and then thoroughly carbolized, and a liberal supply of both hot and cold distilled water is on hand. In cases of burns or scalds, a dressing of carron-oil is sometimes used or a picric acid dressing may be applied.

After treatment in severe injuries, the patient is placed in the cot to recover somewhat from shock, and a number of woolen blankets are kept on hand with which to cover the patient during his removal home or to the hospital, as the case may be.

The company feels that the employe meeting with an injury in or around the works, deserves the best treatment which can be obtained, and has left nothing undone which could in any measure tend towards alleviating the sufferings of any person who should be so unfortunate.

The list of equipment contains: Stretchers, bed and gum blanket, operating table, air cushion or pillow, foot-bath, sterilizer, needles, silk, catgut, virgin silver wire, hypodermic syringe with morphine and strychnine tablets, lancets, scissors, artery forceps, bone forceps, amputating saw, 1, 2, and 3-inch roller bandages, triangular bandages, 3 tourniquets, ½, 1, 1½, 3-inch adhesive Z. O. plaster, iodoform and aseptol, chloroform, ether, alcohol, acetic acid, bichloride of mercury tablets, picric acid, carbolic acid, carron-oil, arnica, Linton gauze and cotton to make the necessary dressings, six woolen blankets.

FIG. 2.—SURGICAL DEPARTMENT, MESTA PLANT.

American Sheet Steel Co.

The American Sheet Steel Co. has an emergency department in connection with the other notable betterment features of the Vandergrift Works, at Vandergrift, Pa. The hospital is a separate and conveniently located building, which is illustrated in Fig. 3. The operating room or surgery is shown in Fig. 4; the ward containing a couple of beds is seen in Fig. 5, and Fig. 6 is the reception room. The company employs two competent and experienced nurses, one being constantly in attendance to give aid to the injured. There are two available surgeons in the town of Vandergrift whose services can be obtained at a moment's notice and if in the opinion of the nurse on duty the surgeon's presence is necessary to attend to any case after the first dressing, the physician is called at once.

There are no printed instructions in or around the works pertaining to the hospital save the following:

WARNING.

In the event that an employe meets with an accident, and no matter how slight may be the injury, it is his duty, and he is hereby notified, to report immediately to the attendant in the emergency room for proper attention, so that the necessary precaution may be taken against complications which are liable to arise.

The manager of the company, E. W. Pargny, says: "When an employe is engaged, he is immediately made acquainted with the location of our little hospital and cautioned to follow the directions as above given, if occasion demands it. No outside equipment is provided, as in the case of an injury the

FIG. 3.—EMERGENCY HOSPITAL AT VANDERGRIFT, PA.

unfortunate can either walk or be carried to the emergency room and get aid within less than five minutes following the occurrence of an accident.

"We do not look favorably upon the feature of outside

FIG. 4.—OPERATING ROOM.

equipment, preferring to have all injuries attended at the point where all facilities are at our command, and by those whose business it is to do nothing else. In this way we can always feel that our men are receiving the best possible care administered by experienced nurses. No matter how slight the injury, we insist upon the men reporting promptly for treatment, and in all instances they must return for redressings at the time set by the attendant.

"A complete record is kept of each injury, its nature and the treatment accorded, so that our nurses can know the history of the case from the very start and be guided accordingly."

Pennsylvania Steel Co.

The following has been received from the surgeon's office at the Pennsylvania Steel Co., at Steelton, Pa.:

"This company has a separate department known as the surgical department, to which all matters pertaining to the physical welfare of its employes are referred. This includes care of the injured, first aid to those taken ill while at work, and such disinfection and matters of general hygiene as may be necessary to conduct a large industrial establishment from a sanitary standpoint. We employ a surgeon and an assistant surgeon, and a trained male nurse.

"All injured and those taken ill at work are taken to the surgical rooms where they are looked after. All necessary operations are performed here, after which the men are either taken to their homes or are sent to the Harrisburg hospital, three miles distant. We have our own ambulance

FIG. 5.—THE WARD ROOM.

which contains two stretchers. In addition, we have several stretchers fitted to shifting engines. These are used to more rapidly transport the injured from the more distant parts of the works to the surgical rooms. Each separate department of the plant has its own stretcher and a box containing a tourniquet, lint, cotton, badges, carbolized vaseline, lead dater, and laudanum, Squibb's mixture for colic and cramps and aromatic spirits of ammonia as a rapid stimulant. Printed directions are on the door of each case. All our employes are given absolutely free treatment from the time of their injury until they recover, and everything that is necessary to make them well is supplied by this company free of cost. There are treated on an average in our surgical rooms about fifty patients daily. Only a small proportion of these are new cases, however, most of them being old injuries which require redressing.

"When an injured man has a comfortable home he is usually sent there. If he lives in a boarding house, or, if the character of his injury is such that he cannot be properly looked after at his home he is taken to the hospital. Just as soon as he is able to get about and while still convalescing he is provided with suitable light employment, which not only helps him financially but physically and mentally as well. It has been the practice of this company to supplement such sick benefits of its injured employes by a money allowance in case these benefits do not suffice.

"In case of death due to accident, provision is made for the dependents until they are able to care for themselves. Each case is considered on its merits and notwithstanding the large number of accidents which have occurred in the various departments of this company during the past fifteen years, there have been but three actions for damages for per-

FIG. 6.—THE RECEPTION ROOM.

sonal injuries. These cases possessed so little merit that the trial judge promptly ordered a non-suit."

The Maryland Steel Co.

The Maryland Steel Co., of Sparrow's Point, Md., says: "At a central point in each of the departments, we have cots or stretchers, with blankets and pillows, bandages, absorbent cotton, gauze, iodoform, adhesive plasters, cocaine sol., Friar's balsam, etc. We also have resident physicians and surgeons within convenient call to attend to any emergency.

"We have at times had instructions posted in these various departments, but find the men do not pay much attention to them, except in a general way, the surgeons being so quickly available. Fortunately, we have had very few accidents where a man has been without surgical help within a short time."

Wellman-Seaver-Morgan Co.

The Wellman-Seaver-Morgan Co.'s plant at Cleveland, is provided with an operating table, stretcher and a supply of Linton gauze, adhesive plaster, arnica, and a few similar preparations. The stretcher and operating table are located at a convenient point in the works and the foremen in all the departments are instructed as to what to do in case of accident occuring in their departments. Every department of the works has telephonic communication through a private main exchange and at each telephone there is a list of 'phone numbers for ambulances, hospitals, etc., and surgeons whom

the company employs. Some one of the surgeons retained by the company is immediately summoned by telephone in all cases requiring medical treatment. If the accident is one requiring hospital treatment, the hospital is notified and the ambulance called. The firm has made thorough provision for the care of those injured, but it is gratifying to learn also that few of the accidents are of any account.

The Webster, Camp & Lane division of the Wellman-Seaver-Morgan Co. has stretchers and the following equipment at the Akron and South Akron, O., works :—Extract of witch hazel, carbolic acid, carron oil, boro-chloretone, adhesive plaster, gauze, Wood's patent absorbent, green soap, clean cotton and brush. A copy of the instructions prepared by Dr. Cranz is posted in the office of the superintendents at both plants. The instruction card reads as follows :

EMERGENCY INSTRUCTIONS.

For ordinary injuries, when any one is hurt take a teaspoonful of carbolic acid and put it in a basin of hot water. Then thoroughly wash and cleanse part with green soap and brush

If there is an open cut, dry the part with clean cotton, and dust the wound with the powder boro-chloretone, then bandage the part.

For burns, saturate the gauze or cotton with the oil and apply over burn and bandage.

Use witch hazel for bruises, cleansing the parts first, then rubbing the witch hazel on, or saturate gauze or cotton and apply to the part, then bandage if necessary.

When severely injured call a doctor at once.

Niles Tool Works, Hamilton, O.

The following statement has been received from the Niles Tool Works, at Hamilton, O.:

"We have an equipment for first aid to the injured. It is located in our stock-room, convenient to the shop, and consists of a cabinet containing the following remedies and supplies : Assorted sizes of silk ligatures for sewing up wounds. Absorbent cotton. Linton moist gauze borated plaster of paris bandages for broken bones. Compressed antiseptic tablets used in warm water for washing injuries. 1-inch and 2-inch width adhesive plasters. Pure medicated cotton and other bandages, 1, 2, 3, and 4 inches wide. Cholera medicine for summer complaints. Aqua ammonia for headache or fainting. Extract witch hazel for stiffness. Spirits camphor for headache or toothache. Carron oil. Burnease oil and cider vinegar for burns. Spirits turpentine for cuts. Arnica for bruises. Two granite basins. Gas stove for heating water rapidly.

Stretchers are made to suit patrol wagon, in case the injured person is to be taken to hospital or home. Our stretchers are suspended from ceiling with iron rods. Medicine cabinet very near at hand. Should the injury be a severe one the stretchers are prepared with cotton blankets, pneumatic rubber pillow, etc., and suspended at once to receive the injured. A physician is immediately called and every possible effort to comfort the injured is made pending the arrival of same.

"We consider our equipment a very good one and it has met every requirement so far. Having the above named specifics and appliances at hand expedites matters should a physician in his hurry forget to bring the necessaries needed. We use no sponges in washing wounds, using fresh absorbent cotton—this insures cleanliness. The person washing the wounds must have very clean hands."

Midland Works of American Sheet Steel Co.

The statement has been made that the American Sheet Steel Co. would have extensive hospital equipment at the Midland Works but the following letter from Mr. Reynolds, at Muncie, Ind., corrects this report:

"The newspaper accounts have been somewhat exaggerated regarding our emergency hospital and have conveyed the wrong impression to a vast number of persons. In the first place, our plant employs only about 450 people, which would not justify the erection and maintenance of a very large hospital. We will say, however, that we have two very nice rooms, about 10 by 12 feet, fitted up with steam heat, hot and cold water and all conveniences necessary for an emergency room, such as portable operating table, double irrigator on rollers with extensive rod, three bowl solution stand, 20x36-inch glass instrument table with three shelves, copper sterilizer, white enameled iron cot with all necessary covering and pillows ; also a sufficient supply of bandages and simple remedies to care for any ordinary injury.

"It is not our intention to have a skilled surgeon in constant attendance, but we will have a man on duty at all times who is sufficiently posted as to care for ordinary cases, and if a skilled surgeon is necessary he can be secured within a very few minutes' time."

Benedict & Burnham Mfg. Co.

The facilities at the plant of the Benedict & Burnham Mfg. Co., at Waterbury, Conn., are described by the firm as follows:

"We have equipped each department with a case which contains absorbent cotton, absorbent gauze, arnica, oil for burns, also a quantity of bandages and surgeons' plasters such as anyone with ordinary intelligency can apply. In all cases, unless very slight accidents, the injured party, after having received attention with the materials at hand, is turned over to a doctor for immediate attention. In case the party is injured so that it is unwise to take him to the doctor's office, a doctor is called in.

"We have no instructions that are regularly issued to the help in regard to injuries, but when a man is hurt he goes at once to the office of the department in which he is employed and some one of the clercial force takes the case in hand, making out the necessary report for the main office, and, if necessary, directing the man to go to a doctor, giving him an order for same, the company being responsible for the first dressing only."

Brown Hoisting Machinery Co.

The Brown Hoisting Machinery Co., of Cleveland, sends the following letter written by Mr. Wightman, who attends to the accident department of that company:

"In my opinion the following equipment for rendering first aid to the injured should be installed in all places of employment, wherever possible, and where local conditions require an equipment of this nature. By local conditions is meant : 1, the character of work performed; 2, the number and sex of persons employed.

"Private room, well lighted and ventilated, with arrangements for hot and cold water, couch, stretcher, blankets, crutches, wash-bowl, chairs, towels, soap, glasses and an accident cabinet containing the following: Antiseptic solution (this being the most essential and desirable), absorbent cotton, aseptic gauze, roller bandages 1 inch, 1½ inches, and 2 inches, arnica or witch hazel, carron-oil, adhesive plaster, solution for inflamed eyes, spiritus frumenti. Necessary instruments for the proper use of the above, such as scissors, spoon, pins, etc.

"With reference to our present equipment for rendering first aid to the injured, beg to say that it is a temporary equipment gotten together immediately after the fire, and as such, has been used up to the present time.

"It has been my intention when we were permanently located, to have something of a more serviceable and presentable appearance installed. However, the equipment that we have is, I believe, a great deal better than will be found in most places.

"Owing to our proximity to the St. Clair hospital, we have our own stretcher and blanket, and with it feel free to say that in the majority of cases we have the injured party at the hospital before an ambulance could be called.

"We are also equipped with various sizes of crutches for those, who having a foot or leg injured, do not care to avail themselves of the use of the stretcher ; also, for those who may require them until their injured member is well enough to use in the natural way.

"I should say that about 75 percent of the accidents occurring at our works are of such a slight nature that they are taken care of by ourselves. For this we have the following equipment in our accident cabinet : A 1-1000 solution of bi-

chloride of mercury, absorbent cotton, carbolic salve, aseptic gauze, collodion, roller bandages of 1-inch, 1½-inch and 2-inch, sizes, arnica, iodine, carron oil, sal soda, a solution of 2 per cent boric acid in normal saline, adhesive plaster, glycerine, surgeon's court plaster, Jamaica ginger, spiritus frumenti.

"The above, with the necessary implements for the proper use of same, such as surgeon's pocket case of instruments, eye dropper, pins, etc., complete our equipment."

Westinghouse Electric & Manufacturing Co.

The superintendent of the Westinghouse Electric & Manufacturing Co., at Pittsburg, says :

"We have in our works a number of stretchers, blankets, and air pillows for anyone who might get injured and have to be carried to the doctor's office. Each foreman has bandages, witch hazel and arnica, which can be obtained at almost a moment's notice should any one bruise or cut himself, and immediately thereafter they are sent to our works physician, who is stationed just outside the works, to receive the first medical attention. We have also in our power house and brass foundry picric acid solution to be used in case of burns or scalds."

Dodge Manufacturing Co.

The equipment of the Dodge Mfg. Co., of Mishawaka, Ind., consists of an emergency case and a regulation ambulance stretcher, which, so far, has satisfactorily taken care of all their emergency cases. The firm reports further, that:

"We aim to secure the services of a doctor as quickly as possible when the seriousness of the accident or sickness warrants his attention, otherwise our Red Cross outfit amply fills the bill. The essentials of this outfit are an ample supply of sterilized bandages, rubber adhesive plaster, antiseptic compresses, absorbent cotton, antiseptic tablets, aromatic spirits of ammonia, ointment of boric acid and syrup of ipecac.

"In the case of an accident, if the patient is not totally disabled he is brought to our supply room which is centrally located and the first aid given. In the case of a severe accident the stretcher is immediately sent to the scene of trouble and a restorative applied and the injured or sick man made as comfortable as possible until the arrival of the physician and conveyance. The patient is then sent home. Our outfit is very simple and inexpensive but with it we are able to satisfactorily take care of all our sick and injured until such a time as the patient is given into the hands of a professional."

Baldwin Locomotive Works.

The Baldwin Locomotive Works, Philadelphia, point out the peculiar conditions of a plant located in the center of a large city, as follows:

"Our works are situated in the central part of the city of Philadelphia adjacent to three large well equipped hospitals, besides which there are a number of excellent physicians and surgeons close by. It is possible to have an ambulance from one of thes institutions within a very few minutes after an injury to an employe has occurred, so quickly in fact that we rarely find it necessary to call for the physicians or surgeons who are nearer to us. Our men take advantage of these hospitals for treatment of petty injuries, large numbers being treated by each during the course of the year. Under these circumstances we have not felt the need for any special equipment of our own for rendering aid to the injured."

Norton Emery Wheel Co.

The Norton Emery Wheel Co., of Worcester, Mass., has a litter hung in a conspicuous position at the factory door and near this is placed a box containing a rubber blanket, a woolen blanket and a pillow. A list of the contents of the box is painted on the door. A portable medicine box is kept in the laboratory and the first aid to the injured rendered by one of the men employed in that department. This first aid box contains bandages of all kinds, absorbent cotton, adhesive plaster, antiseptic tablets, iodoform, needle, thread, scissors and a pair of forceps. An enameled wash basin, a two quart bottle of carbolated oil for burns, a supply of quinine and whiskey, medicine for stomach troubles is also kept in readiness. One of the workmen is quite expert in the removal of iron and steel chips, as well as particles of emery from the eye. He uses a small magnetized steel spatula, shaped something like the pointed orange-spoon but of course on a much smaller scale. Sometimes a camelshair brush is found very useful. The men in charge of the emergency cases have had no special training. Most of the injuries are slight, usually fingers and toes, and the men return to work as soon as the treatment has been applied. A record is kept of the cases, which numbered fifty-seven in about eight months. The superintendent reports that the above provision for first aid to the injured has proved in their experience to be satisfactory.

Carborundum Co.

The Carborundum Co., of Niagara Falls, N. Y., has found the following supplies of value in emergency cases : Assorted widths of Linton gauze bandages, absorbent cotton, Lysol antiseptic solution, carbolated vaseline, tallow ointment for burns, collodion, aromatic spirits of ammonia, adhesive tape, brandy, a 2 percent solution of cocaine for the eye.

The tallow ointment is a special preparation which is used as a coating on burned skin and it is claimed to give almost immediate relief from pain. The recipe for this ointment is as follows : Pure mutton tallow, six ounces; olive oil, two ounces; carbolic acid crystals, ⅛ of an ounce. Melt and mix together, stirring as the compound solidifies. This ointment is in continual use and has secured in every case very satisfactory results. The aromatic spirits of ammonia is used in quantities of five to ten centimetres as a stimulant in cases of carbon-monoxide poisoning. The faintness and giddiness succeeding a slight poisoning from this gas is almost instantly relieved by this liquid. It is also employed in the works as a stimulant in case of heart weakness from other causes. The brandy it is well to note is used for cases of faintness succeeding shock from injuries in which the bleeding is but slight, but not of course where the blood flows to any extent.

Cincinnati Milling Machine Co.

The medical department at the plant of the Cincinnati Milling Machine Co., of Cincinnati, carries the following line of articles: Linseed oil and lime water, arnica, listerine and a powder for the purpose of stopping the flow of blood, court plaster, cotton bandages, and is also equipped with an instantaneous water heater. When a man meets with an accident he is immediately sent to the medical department. If the wound is only a superficial one, it is washed and one of the above remedies applied. A wound of a more serious character demands different treatment and the man is made as comfortable as possible until the arrival of the physician, who is retained in the employment of the company and as far as it can be done at the shop the wound is bandaged and treated pending the receipt of the more skilled attention from the expert surgeon.

Link-Belt Machinery Co.

The Link-Belt Machinery Co., of Chicago, has a room in the factory set apart for the first aid to injured employes. This room is provided with an operating table, hot and cold water, and a cabinet containing such remedies and supplies as may be used by any intelligent man. Each of the foremen is provided with a key to this room and they are instructed to see that the injured person, if the injury is a serious one, is taken on a stretcher to the room—a surgeon immediately summoned and such available aid given him as the equipment affords. The supplies comprise absorbent cotton, antiseptic and borated gauzes, bichloride of mercury tablets, antiseptic soap, rolled bandages of various widths, surgeons' adhesive plasters, threaded needles and alcohol. There is a point worth noting in the supply of threaded needles. In this manner there is less likelihood of the nervousness inseparable from the scene of an accident interfering with the prompt progress of the first aid work. Threading a needle is for unaccustomed fingers not a speedy task at any time. The doing of a task of this sort at a time when the operation need not be hurried is a wise provision.

The surgeon employed by the company is very accessible and on that account no effort is made in a serious case to do

more than make the injured man comfortable until the doctor arrives, most of the remedies and supplies enumerated being provided for the use of the medical man. The list of supplies was suggested by the physician employed and he has made a specialty of accident cases. The firm ventures the suggestion that greater care should be taken of these apparently trivial injuries which frequently from lack of being made antiseptic and kept safe from infection result seriously. Particular attention is paid to this requirement and with very satisfactory results.

Jeffrey Manufacturing Co.

The Jeffrey Manufacturing Co., of Columbus, O., sends the following interesting statement :

"We have in our works, two cases containing materials to be used as first aid to injured employes. One case is located centrally in our sheet metal department and contains bandages, and simple remedies such as may be necessary in cases of minor accidents. The other case is located in the tool room of our main machine shop and has a larger supply of bandages, splints and remedies.

"In our tool room we have a man who has made something of a study of first aid to the injured, and his knowledge and services have proven on many occasions of great value. He is always to be found at his post of duty and he has everything which may be necessary, ready at a moment's notice so that there is never any waiting or confusion.

"We keep constantly on hand supplies of antiseptic remedies, arnica, witch hazel, peroxide of hydrogen, whiskey (to be used as a stimulant when necessary), various salves and oils.

"We have found that much suffering is relieved by keeping always on hand a mixture of linseed oil and lime water to be used in case of ordinary burns such as are received generally about manufacturing institutions and especially in foundries. We always keep picric acid, which is the best remedy we have found for burns received in electrical work.

"By having a definite place to which injured men are taken, we avoid the crowding due to sympathy and curiosity, and this renders the work of relief much easier and quicker.

"Our foremen are instructed to report all accidents, no matter how trivial, to the man in the office who has charge of such matters, and to make request for conveyance for the injured employe to the office. We have arrangements with a near-by livery stable so that we can always secure a conveyance for the injured man in a very few moments.

"We also have a company physician employed by the year, whose office is near our works and there is always medical attendance to be found at his office, no matter what time of day or night we send men there. When an injured man is sent to the physician, he is given a slip stating that he is from our works and everything possible is done in the way of relief.

"Where the injury is serious, our physician has instructions to send our employes direct to a hospital which is near at hand.

"We have found these arrangements to be very satisfactory in every respect and we believe, that aside from the humanitarian aspect of the matter, which of course, must appeal to every one employing men, it really is best from a business standpoint."

The Legislature of Michigan has passed a bill appropriating $171,900 for the Michigan College of Mines at Houghton, for the biennium beginning July 1, next. The most important item of this appropriation is that of $45,000 for the construction of a metallurgical laboratory. The college intends to erect a substantial building for this purpose and to equip it thoroughly for experimental work. Electrometallurgy will receive special attention. It is intended to install furnaces of larger capacity than is usual in college laboratories. A separate department of ore dressing and metallurgy will be established. Beside the amount for a metallurgical laboratory the bill referred to carries an appropriation of $9,000 for extending the equipment of the department of mining engineering, which now occupies its new building erected last year ; $4,000 for completing the equipment of the chemistry building, also erected last year ; $2,000 for providing additional cases for the mineralogical museum ; and $1,000 for increasing the equipment of the department of mechanical engineering.

LAKE SUPERIOR IRON MINES.

The next meeting of the Lake Superior Institute will probably be held about the third Tuesday in August. A meeting of the council will be held within a short time, when the exact date will be fixed. It is now thought that the meeting will be held on the Marquette Range, with possibly a trip to the Soo as one of the excursion features.

Owing to the unusual interest in iron ore discoveries in Wisconsin, especially in Sauk County, near Baraboo, the Wisconsin Geological Survey will give special attention to this district. According to Director Birge, of the survey, more work will be done by the department this year than during any previous year in the history of the state. Profs. Weidman and Smith, of the survey, have for some time been investigating the Sauk County iron fields, and will continue this work until a complete survey is made, and the territory mapped.

The Cleveland-Cliffs Co. has secured an option on the Ogden mine, three miles from Negaunee, and will soon commence to pump out water, after which the work of active mining will begin. The Ogden has been closed for many years. The ore is of low grade, which the company finds it can use to advantage in the new blast furnace at Marquette.

The old No. 1 pit at the Florence mine is being cleaned out, and a double track built to the surface, preparatory to a resumption of mining operations. The management expects to take out about 25,000 tons from No. 1 this season. Owing to the difficulty og getting cars the output from Nos. 4 and 7 shafts at the Florence is being dumped on the stock pile.

The Oliver Iron Mining Co. is getting the machinery and materials on the ground for the sinking of a large shaft on Sec. 13-47-47, north of the Bonnie mine, east of Ironwood, Mich. Two large boilers and a hoisting plant will be installed. The shaft will be a large one with four compartments.

Mining at the Armenia, on the Menominee Range, has been suspended for the season. This action is said to be due to the dullness in the ore market, but the mine will be left in such condition that work can be resumed later in the year if conditions warrant so doing. The Great Western on this range will be operated throughout the summer, but it is not probable that the stock pile will be shipped. The Crystal Falls and Tobin mines will be worked to their full capacity. The Lamont will be operated on a moderate scale, and the sinking of the Dunn shaft will be finished.

No ore is being shipped from the Volunteer mine, Marquette Range, as the steel corporation is awaiting the completion of the new ore crushing plant at Escanaba. At the Bessie, Marquette Range, mining is progressing on the fourth level, which was added last winter. The grade of ore is low.

The Buckeye mine, Mesabi Range, has been optioned to the Buffalo & Susquehanna Iron Co. The contract for drilling has been awarded to George H. St. Clair, who has begun the work. The lease is owned by Minneapolis people and the fee by the State. The property has been optioned for a number of times but abandoned in each case. The deposit is similar to that of the Arcturus mine, which is in the same district.

The exploration of the Illinois Mining Co. on lot 3 in Crystal Falls, Mich., indicates that a mine may be developed. The shaft is now down 200 feet and the workmen are drifting to the southwest.

Captain Samuel J. Gribble, of the Columbia mine, has been appointed head mining captain at the Norrie mine, Ironwood. Capt. Gribble went to Crystal Falls from Ironwood three years ago to take charge of the Columbia mine.

E. F. Brown, manager of the Pewabic Mining Co., and W. D. VanDyke, of Milwaukee, have taken an option on the Beta and Nanaimo mines, on the Menominee Range, and are now engaged in having an abstract of the title to the properties made. If the title if found clear, they will begin pumping in a few days. The Nanaimo was one of the first mines opened in the Iron River district, and during its operation has produced 127,566 tons of ore, but it has not been in operation since 1891. The Beta mine produced 1,585 tons prior to 1887, and was operated to a limited extent in 1887 and 1891, but the total output has been only 4,211 tons, and the mine has been idle since 1891.

Some curtailment of Marquette Range operations has been carried out the past week, and a good many men have been laid off at the mines of the Oliver Iron Mining Co. and the Jones & Laughlin Steel Co.

TESTS WITH HIGH-SPEED TOOL STEEL.

The paper on high-speed tool steel, printed in *The Iron Trade Review* for May 21, was read at a recent meeting of Cincinnati manufacturers by William Lodge, of the Lodge & Shipley Machine Tool Co. Mr. Lodge in his address mentioned a tool cutting test and also called attention to the economical use of high grade steels by making the tools out of common steel, having a piece of the more expensive material brazed on for a cutting edge. We have been favored with the record of the shop test, also with one of these tools fitted up in this manner. The size of the stock employed for the shank of the tool shown in the photograph, reproduced in Fig. 1, was 1x2 inches, and they are made from this size up to 2x5 inches. The stock brazed on to the common steel is from ¼ inch up to ⅜ inch thick, according to the size of the tool. The piece is wired into place and when sufficiently hot for brazing is dipped into raw linseed oil. The sample sent shows a very close contact between the cutting strip of high grade steel and the backing or supporting material, and in the half-tone the line of demarcation will not be very evident. The supporting stock is shaped to the necessary angle for the requisite amount of top rake and as the bulk of the grinding will be at the end of the tool, most of the strip will serve for cutting purposes.

FIG. 1.—PLANER ROUGHING TOOL MADE FROM COMMON STEEL WITH STRIP OF HIGH GRADE TOOL STEEL BRAZED ON.

WET OR DRY	FEED	DEPTH OF CUT	CUTTING SPEED IN FT. PER MIN.	MARK ON TOOL	DURATION OF CUT IN MIN.	DIA. AT TOP OF CUT IN INCHES	DIA. AT BOTTOM OF CUT IN INCHES	TOTAL LONGITUDINAL FEED OF TOOL IN INCH	KIND OF TOOL	SIZE OF TOOL	SPEED	GEAR	REMARKS
OPEN BELT													
W	.0265	1/16	215	NOVO	1 Min.	4 11/16	4 5/16	5	L.H. ROUGH	1 x 2	170	5 F	TOOL O.K. MAT. M.S.
W	.0265	1/16	290	"	50 Sec.	4 11/16	4 5/16	5 1/2	"	"	240	2 S	" "
W	.0265	1/16	285	"	58 "	4 5/16	4 1/16	6 1/4	"	"	240	"	" "
W	.0265	1/16	280	"	58 "	4 5/16	4 1/16	6 1/4	"	"	240	"	" "
W	.0265	1/16	274	"	60 "	4 5/16	4 3/16	6 1/2	"	"	240	"	" " TOOL REGROUND
W	.0265	1/16	262	"	55 "	4 5/16	4 1/32	5 3/4	"	"	240	"	" "
W	.0265	1/16	255	"	1-20	4 1/32	3 7/8	8 1/2	"	"	240	"	" "
W	.0265	1/16	244	"		3 7/8	3 3/8	10	"	"	240	"	" " LIMIT OF BELT PULL
W	.0265	1/16	228	"	1-50	3 7/8	3 1/2	11 1/2	"	"	240	"	" " TOOL REGROUND
W	.057	1/16	155	"	2-50	3 1/2	3 1/4	28	"	"	170	5 F	" "
W	.057	1/16	150	"	2-55	3 1/4	3 1/4	28	"	"	170	"	" "
W	.114	1/16	140	"	1-25	3 1/4	3 1/8	28	"	"	170	"	" "
W	.114	1/16	138	"	1-33	3 1/4	3	28	"	"	170	"	" "
W	.114	1/16	133	"		3	2 7/8	28	"	"	260	4 F	" " LIMIT OF BELT PULL
BACK GR. IN													
W	.057	1/16	83	ALLENS	3'5"	4 1/4	3 1/4	12	R.H. ROUGH	1 1/2 x 2	77	1 F	TOOL O.K. MAT. C.R.
W	.057	1/16	83	"	1-10	4 1/4	3 1/4	10	"	"	"	"	" "
W	.057	1/16	78	"	3	3 1/4	3 1/8	15	"	"	"	"	" "
W	.057	1/16	78	"	3-10	3 1/4	3 1/8	8 1/2	"	"	"	"	" "
W	.057	1/16	83	"	1-10	4 1/4	3 1/8	4	"	"	"	"	" "
W	.229	1/16	68	"	1-25	3 7/8 F	3 1/4	23	"	"	"	"	" "
W	.229	1/16	68	"	1	3 7/8	3	16 1/2	"	"	"	"	" " LIMIT OF BELT PULL
W	.229	1/16	68	"	22'	3 7/8	3	6 1/2	"	"	"	"	" "
W	.057	1/16	83	"	1-30	4 1/4	3 1/2	5 1/2	"	"	"	"	" "
W	.057	1/16	71	"	1-45	3 7/8	3	7 1/2	"	"	"	"	" "
W	.4	1/16	60	"	58'	3	2 7/8	23	"	"	"	"	" "
BACK GR. IN													
W	.08	1/32	140	NOVO	5'15"	7	6 1/2	10 1/2	L.H. ROUGH	1 x 2	77	1 F	TOOL O.K. MAT. M.S.
W	.1	3/32	131	"	2-8	6 1/2	6 1/4	14	"	"	"	"	" "
W	.2	7/16	126	"	1-25	6 1/4	6 1/8	20	"	"	"	"	" "
W	.114	1/16	123	"	2-10	6 1/4	5 1/2	19	"	"	"	"	" "
W	.229	1/16	118	"	1-25	5 1/2	5 1/2	20 1/2	"	"	"	"	" "
W	.4	1/16	113	"	45'	5 5/8	5 1/2	20 1/2	"	"	"	"	" " LIMIT OF BELT PULL
W	.2	1/16	111	"	1-30	5 1/2	5 1/4	20 1/2	"	"	"	"	" "

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FIG. 2.—SERIES OF TOOL STEEL TESTS MADE ON A K, 36-INCH LATHE BY THE LODGE & SHIPLEY MACHINE TOOL CO.

The table, Fig. 2, tells its own story with these exceptions: The type and size of lathe was a Lodge & Shipley K, 36-inch and the tools used on the tests were forged from the solid stock.

The Standard Welding Co., of Cleveland, reports that it is in receipt of more business for this season of the year than ever in the history of the company.

The Western Machinery Market.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK.

CHICAGO, June 2.—Business during the month just closed has been of considerably less volume than that transacted in several months. On all sides the labor agitation is condemned, and to the industrial unrest prevailing in all the large manufacturing centers is attributed in a large measure the decreased demand for machinery. The increased cost of tools caused by the wage advances demanded by unions has also militated strongly against new purchases, and during the month inquiries representing many thousand dollars have been withdrawn from the market, purchasers preferring to wait until prices are lower and the labor situation improves before placing their orders. Chicago in particular is suffering from an epidemic of strikes that is affecting all branches of labor; and from the frequency of turmoil of this kind, several manufacturers who had planned extensive improvements to their plants have abandoned the same and are reported to be considering the advisability of locating elsewhere. Notwithstanding the unsatisfactory conditions prevailing at the present time, however, all are agreed that the business outlook is good, and there is no doubt that with the settlement of labor troubles there would be a marked revival of trade.

Camp Engineering Co., Chicago, rebuilder of second-hand automatic engines, advises us that there is a good inquiry and that sales are fairly numerous. Among the orders shipped are the following: a 50-h. p. Armington & Sims to Carbon, Ind.; a 50-h. p. Ideal to Duluth, Minn.; two Westinghouse engines of 60-h. p. and 75-h. p. to La Harpe, Kans.; a 60-h. p. Westinghouse at Chicago; a 70-h. p. McEwan to Lost Nation, Ia.; a 35-h. p. New York Safety at Chicago; a 150-h. p. Buckeye, and a 50-h. p. Westinghouse to Sault Ste. Marie, Canada, and a 100-h. p. Hamilton Corliss to Weleetka, Ind. Ter.

Whiting Foundry Equipment Co., Harvey, Ill., reports a lessening of demand, which it attributes largely to the labor agitation and the unsettled condition of Wall street. Its view of the future, however, is optimistic, believing that with the subsidence of the industrial unrest at present prevailing, there will be a resumption of activity in all branches of industry. The outlook is good and orders are being received from all parts of the United States, several of large size coming from iron and steel plants. The company is extending its power plant building, engine and electrical equipment.

Armstrong Bros. Tool Co., Chicago, states that the volume of its sales in the month just closed compares very favorably with the amount of business transacted in any previous month. A marked increase is apparent in the company's foreign business, which is due principally to the fact that it recently placed on the market a line of lathe and planer tools especially designed for use on machines of English or European make. The demand for its new cutting-off machine is satisfactory, and in all departments an increasing activity is noted.

George Whiting Co., Chicago, manufacturer of punches and

shears, expects to add largely to its capacity in the near future, negotiations being in progress for an extension of the machine shop. While there is some depression in trade caused by the labor unrest, this condition is thought to be merely temporary, the orders held up pending the settlement of existing strikes justifying in the opinion that there will be a heavy demand for all classes of machinery this fall. During the month just closed, shipments were made to the following concerns: One pump to the Kroeschell Bros Co. Boiler Works, Chicago; one double punch and shear to McAleenan Boiler Co., Peoria, Ill.; one double punch and shear to the American Tower & Tank Co., Elgin, Ill.; one double punch and shear to Sackett Screen & Chute Co., Chicago; also a carload of punches and bending rolls to the Worden-Allen Bridge Works, Milwaukee, Wis.

Charles H. Besly & Co., Chicago, report that their general business is very good, orders for Gardner grinders, Badger and Bonanza oil cups, Helmet oil, etc., being of a satisfactory volume. Shipments of grinders have recently been made to New York, Pennsylvania, Ohio, Wisconsin, Michigan and California, and a repeat order for this machine was received by cablegram from Vienna, Austria. The company is experiencing some difficulty in obtaining the higher grades of tool steel, also malleable castings, which has caused a slight delay in filling its orders. Business with automobile manufacturers is growing rapidly, a large increase in the number of shops engaging in the manufacture of these vehicles, or for the repair of same, being noted.

Pawling & Harnischfeger, Milwaukee, Wis., crane and hoist builders, advise that orders are plentiful, though during April there was a decided hesitancy on the part of buyers who apprehended more than the usual labor troubles about May 1. As these labor troubles, except in certain localities, have adjusted themselves, the business situation appears healthy, as judged by buying and settlements. The many new and modern shops planned by railroads have resulted in a large volume of estimates for crane equipment, and many of these contracts will be closed within the next 30 days. Steel and iron manufacturers still continue the heaviest buyers, though the demand for cranes is broadening. The company has leased and equipped the old Nordberg shops on Virginia St. to replace its erecting shop burned April 15, and this has placed it in as good shape to build cranes as prevailed before the fire. Prominent among the orders booked since the last report are the following: American Stone Crane Co., Brooklyn, N. Y., two cranes; Milwaukee Bridge Co., Milwaukee; Louisville Railway Co., Louisville, Ky.; Louisiana Purchase Exposition, St. Louis; Ingersoll-Sergeant Drill Co., Easton, Pa., two cranes; Milton Mfg. Co., Milton, Pa.; Vilter Mfg. Co., Milwaukee, Wis.; American Road Machine Co., Kennett Square, Pa.; Stilwell-Bierce & Smith-Vaile Co., Dayton, O., two cranes; Mahoning Foundry & Machine Co., Youngstown, O.; New York Shipbuilding Co., Camden, N. J.; McConway & Torley Co., Pittsburg, Pa.; Sterrit-Thomas Foundry Co., Pittsburg, Pa.; Standard Oil Co. (Atlas Works, Buffalo); Pennsylvania Engineering Works, New Castle, Pa.; Metropolitan Street Railway Co., Kansas City, Mo., two cranes; Jefferson & Clearfield Coal & Iron Co., Ernest, Pa.; International Harvester Co., Hamilton, Ont.; Gould Coupler Co., Depew, N. Y., three cranes; Helena Light & Traction Co., Helena, Mont.; American Sheet Steel Co., Pittsburg, two cranes (one special); Allis-Chalmers Co., Milwaukee, two cranes; Howard Iron Works, Buffalo; American Bridge Co., Economy, Pa.; LaBelle Iron Works, Steubenville, O.; Bradley Mfg. Co., Pittsburg, and the New York Edison Co., New York.

Standard Railway Equipment Co., East St. Louis, Ill., manufacturer of pneumatic tools, reports that the demand for its tools exceeds the capacity of its shops to fill same, and that an extension to the plant is under consideration. The company is bringing out some new tools, among which is a line of air drills of twelve different sizes of perfectly balanced machines of four cylinders, piston type; also a new line of riveters.

American Well Works, Aurora, Ill., states that there is a good demand for its line of pumps and prospecting machinery, and believes trade will continue good, providing the labor troubles soon cease.

S. Freeman & Sons Mfg. Co., Racine, Wis., has had a steady demand for its internally fired corrugated furnace boilers and other power plant equipment, and is engaged in an extension of its boiler shop for the purpose of more promptly filling orders for same. Among recent orders are the following: Big Four Wilmington Coal Co., Coal City, Ill., two 150-h. p. internal furnace boilers; City of Woodstock, Ill., two 150-h. p. horizontal tubular boilers; Poehlman Bros. Co., Morton Grove, Ill., two 150-h. p. horizontal tubular boilers; Southern Humbolt Lumber Co., San Francisco, Cal., six 80-h. p. horizontal tubular boilers; Savage & Love Co., Rockford, Ill., two 125-h. p. horizontal tubular boilers; Pittsburg & Montana Copper Co., Pittsburg, Pa., two converter hoods and two steel spoons; Riter & Conley Mfg. Co., Pittsburg, three 250-h. p. internal furnace boilers; Charles P. Willard & Co., Chicago, two Clyde baffle back marine boilers; Bayley Heating Co., Milwaukee, Wis., one Green house boiler, 48 inches by 10 feet; American Falls Light Power & Water Works, Pocatello, Idaho, two 70-h. p. horizontal tubular boilers; Charles Netcher, Chicago, Ill., one 200-h. p. internal furnace boiler; Vincent Kenny, Omaha, Neb., one 300-h. p. Kenny boiler and two 100-h. p. Kenny boilers.

Dings Electro-Magnetic Separator Co., Milwaukee, Wis., is placing on the market a new type of magnetic separator for handling iron sand, ore of iron blend, and other material of a sand like or floury nature. This makes six different types of separators made by them. The company reports a rapidly increasing business and an encouraging outlook for the future.

Whitehead Machinery Co., Davenport, Ia., reports that while there is a good volume of inquiries, orders are scarce.

Industrial Works, Bay City, Mich., states that business continues satisfactory, the capacity of its works being sold for several months ahead.

Fox Machine Co., Grand Rapids, Mich., reports that notwithstanding the many strikes among the trades in which it is most interested, there was no diminution in the volume of orders received during May. The increasing demand for the Fox typewriter has necessitated extensions to the company's plant, which when completed will double its present capacity. Contracts have already been let for the machinery and equipment.

Trees Mfg. Co., Greenfield, Ind., manufacturer of gas pumps, gasoline engines, etc., reports that orders have increased so rapidly in the past six months that plans are being considered for the enlargement of its shops. The company reports that it is now using an automatic governor on its engines which decreases the fuel consumption to a point below that of any other engine, and that it can now make electric light not varying from one to three volts.

Herzler & Henninger, Belleville, Ill., manufacturers of coal mining machinery, has considerable work in hand on orders from coal mines. It shipped during the past month mining machinery to Pennsylvania and West Virginia, and Tornado coal drills to Nova Scotia, and is working on a large order for weigh hopper, shaking coal screens and mine cars for the Carterville & Big Muddy Coal Co., Lander, Ill. The company reports that it will soon be in the market for a bulldozer.

Union Drop Forge Co., Chicago, reports that there is no cessation in business and that the outlook is good, having sufficient orders on its books to keep its plant busy for the next six or eight months. Increases to the company's plant have been under consideration for some time, but, owing to the unfavorable labor situation, these plans have been abandoned for the present. A drop forged claw bar for track work, with movable claw made of tool steel, is being placed on the market, for which a good demand is felt. The superiority of this claw bar over those of the solid type is in the ability to replace the claw quickly in the event of its breaking or wearing out.

Vilter Mfg. Co., Milwaukee, Wis., reports that it is experiencing a good demand for its machinery. Among the noteworthy shipments made in the past month, it mentions the following: Arbogast & Bastian Co., Allentown, Pa., 50-ton refrigerating machine with 20x40 Corliss engine; DuBois Brewing Co., DuBois, Pa., 100-ton refrigerating machine and 30-ton plate ice plant, with 22x42 Corliss engine; Schmulbach Brewing Co., Wheeling, W. Va., 70-ton plate ice plant, with 20x36x42 tandem compound Corliss engine; Cargill Coal Co., Green Bay, Wis., 16x30 Corliss engine; Shreveport Ice & Cold

Storage Co., Shreveport, La., 130-ton refrigerating machine, with 24x48 Corliss engine; Ward-Corby Co., Providence, R. I., 12-ton refrigerating machine; Reno Brewing Co., Reno, Nev., 10-ton refrigerating machine; Ward-Corby Co. Chicago, 10-ton refrigerating machine; Chapin-Sacks Mfg. Co., Washington, D. C., 50-ton plate ice plant, with 16x30x36 tandem compound engine; Ruemmeli-Dawley Mfg. Co., St. Louis, 12x36 ammonia compressor; Ingersoll Packing Co., Ingersoll, Ont., 75-ton refrigerating machine, with 22x42 Corliss engine; Ruemmeli-Dawley Mfg. Co., St. Louis, 150-ton refrigerating machine, with 22x42 Corliss engine; B. D. Eisendrath Tanning Co., Racine, Wis., 20x42 Corliss engine; Ruemmeli-Dawley Mfg. Co., St. Louis, 35-ton refrigerating machine, with 14x30 Corliss engine.

Witte Iron Works Co., Kansas City, Mo., has made carload shipments of gas and gasoline engines during May to Chicago, El Paso, Los Angeles, San Francisco, Salt Lake City and Denver. It anticipates that the volume of its business this year will be 100 percent greater than in 1902.

Henry E. Pridmore, Chicago, manufacturer of molding machines, reports that during the past month he has found business exceptionally good. A great many inquiries were received from manufacturers of heating apparatus, valves and fittings, and among the orders closed he calls attention to one for twelve large double shaft machines for molding sectional boilers. Business among railroad founders has been active, several large contracts for machines for making brake shoes, journal bearings and oil boxes having been received. Shipments of several sets of molding machines for soil pipe work have been made to England during the month, Mr. Pridmore reporting that the inquiry from that country is very good. The total sales of the past 30 days include 110 machines, distributed as follows: 29 machines for railroad castings; 12 for sectional boilers; 10 for pipe fittings; 9 for agricultural implement parts; 7 for cotton machinery parts; 5 for sewing machine parts; 4 for soil pipe work; 3 for engine parts; 15 for special machinery parts, and 16 for miscellaneous work.

Northern Electric Mfg. Co., Madison, Wis., has an optimistic view of the business situation, and reports that the volume of orders for electrical equipment keeps up to past proportions. An extension to the erecting floor and machine shop has just been completed, which will enable the company to handle increasing business with more expedition.

Nordberg Mfg. Co., Milwaukee, Wis., reports that inquiries are more frequent than they have been, and that trade prospects are good. An extension to the company's machine shop, 100x220 feet, is being made, and will be completed about July 10.

Holthoff Machinery Co., Cudahy, Wis., manufacturer of mining machinery, reports that during April it closed contracts amounting to over $100,000. A large number of small orders have been taken during May, with several big deals pending.

National Machine Co., Milwaukee, Wis., finds the demand for its speed lathes improving, several having been sold within the month to local machine shops and one to a Cleveland concern. The plans to build a new plant have been abandoned for the present, owing to the high cost of labor and materials.

Joseph T. Ryerson & Son, Chicago, report a distinct improvement in the demand for tools since the middle of April. The current orders for small tools are quite up to expectations, though contracts for large and heavy equipment seem to be held in abeyance. Notwithstanding, the company closed during the month the most attractive contract for hydraulic equipment ever handled by the house.

Temple Pump Co., Chicago, manufacturer of the "Master Workman" gasoline engine, windmills, etc., reports that the volume of business transacted by it this year is greater than that of any other year, with the possible exception of 1902. It notices a slight falling off in orders in the past few weeks, which is attributed to the heavy falls of rain in the territory in which its product largely sells. Among the orders recently received was a repeat order from Australia, which included an irrigation outfit.

Gardner Governor Co., Quincy, Ill., advises us that in its opinion the continued labor disturbances are seriously affecting all branches of business. It finds that there is a tendency among customers to restrict purchases, and with the increasing cost of all materials a spirit of conservatism is being created.

THE REID BALL BEARINGS.

This line of anti-friction bearings consists of several styles of ball bearings, including both thrust and radial bearings, a single unit of the latter being shown in Fig. 1. The thrust bearing, Fig. 2, was designed to meet the various requirements where it is desired to support the axial thrust of shafts, and the aim was to construct a bearing in which there would be rolling contact only between the balls and ball raceways. The two points of contact A and B on the lower plate are in such a position in relation to the axis of the shaft that the rolling contact circles on the balls are both the same proportion to the contact circles on the same plate. The contact on the upper thrust plate is in a plane parallel to a line drawn through the two points of contact on the lower plate, and it is therefore evident no sliding can take place between the balls and raceways, and the load on the two points of contact must be equal. The tendency to force the balls outward on account of the difference in the angles of the lower plate is counteracted by the angle of the face of the upper plate forcing them in the opposite direction.

A similar thrust bearing shown in section at Fig. 3, is particularly adapted to very heavy loads at moderate speeds, and the points of contact between the balls and plates are in the same relation to each other and to the axis of the shaft as in the bearing at Fig. 2. The features of this bearing

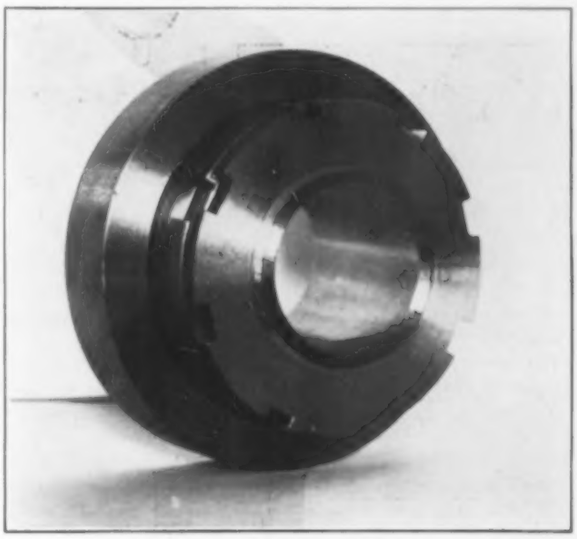

FIG. 1.—A UNIT OF THE REID BALL BEARING.

which give wearing qualities and ability to carry heavy loads, are the curved raceways which are made to conform to radii somewhat larger than the radius of the ball. The difference in the radius to which the groove in the upper plate is formed and that to which the sides of the groove in lower plate is formed is such as to give equal curvature contact in the grooves of both plates.

Fig. 4 represents the simplest form of a ball thrust bearing. The principal point of novelty in this bearing is in the ball-retaining cage, which is made of machine steel, and though light is unusually strong and durable. The cage consists of two parts, an outer and inner cup, C and D, which are pressed together after the balls are placed between them. The thickness of the cage is nearly equal to the diameter of the balls contained in it, and by this construction sufficient metal is left between the holes for the balls to make a strong cage, while the balls are as close together as in bearings without cages.

Radial bearings are in the majority, in practically all classes of machinery, and in the application of anti-friction devices to such bearings, especially with balls, it has generally been necessary to make all parts of the bearing special or an integral part of the machine to which it is applied. Fig. 5 shows a sectional view of a new single unit radial bearing, which is self contained, capable of easy adjustment for wear, and was designed to cover a wide field

of application. The nut lock by which means for adjustment is provided, is one of the main features of the bearing, and is composed of an extended sleeve support E, formed with screw threads of opposite pitch, and co-acting nuts F and G, both of which are resilient in an axial direction at their contact portions. The inner face of the inner nut is presented rigidly to the adjustable cone H, and the opposite face of the inner nut is formed in the shape of a marginal resilient flange

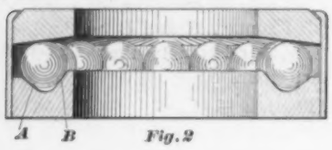

Fig. 2

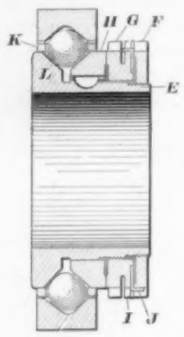

Fig. 5

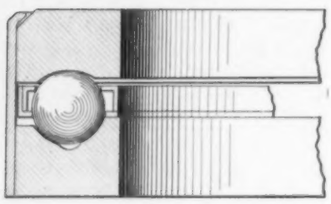
Fig. 3

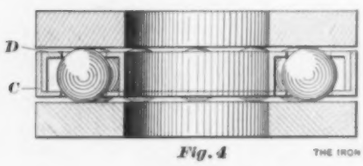

Fig. 4

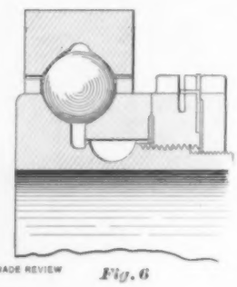
Fig. 6

THE REID PATENT BEARING.

I. Between this flange and the engaging portions of the outer nut is contained a locking washer J having flexible teeth adapted to co-act with the notched portions of the two nuts.

The outer nut F is also resilient in an axial direction on account of the web portion between the outer contact portions and the inner threaded part not coming in contact with

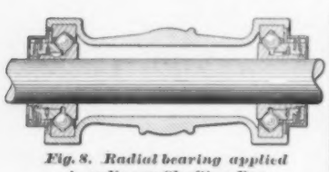
Fig. 8. Radial bearing applied to ordinary Shafting Box.

Fig. 10. Step bearing applied to Drill Spindle.

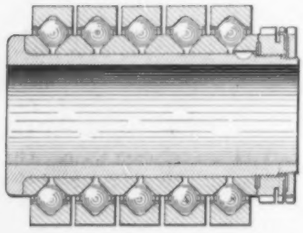
Fig 7. Five Unit Radial Bearing.

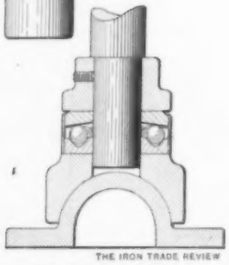
Fig. 9. Self Aligning Step Bearing.

VARIOUS APPLICATIONS OF THE REID BALL BEARINGS.

the inner nut. The notches forming the teeth on the periphery of the locking washer J are differently spaced from those on the two nuts. In adjusting the bearing the inner nut is screwed up until there is no play between the balls and raceways, then the outer nut is forced up until one or more of the teeth on the locking washer can be bent into the notches of each nut, thereby forming a solid, compact, positive lock at any adjustment. A ball separating ring or cage K is generally used, but is omitted in bearings where the conditions do not require one : this cage consists of a ring which is made a running fit on the cones L and H.

Accidents resulting from the breaking of balls or the cracking raceways, such as would destroy ordinary ball bearings, are practically impossible in this bearing as the sleeves are made a running fit on the shafts to which they are applied. For instance, should a ball or raceway break and the bearing stick, the shaft sleeve would run on the shaft as in a plain bearing.

The sectional drawing Fig. 6 illustrates a bearing similar to the one shown at Fig. 4, except in the shape of the raceways which are curved to conform to radii slightly larger than the radius of the ball and the difference in radius to which the ring raceways, shaft sleeve and cone raceways are formed is such as to give equal curvature contact on the outer and inner raceways. The balls in both of these radial bearings have four points of contact with a positive rolling action, and no sliding or slipping can occur. This bearing Fig. 6, was designed particularly for heavy loads at moderate speeds.

A few of the applications of these bearings are shown in the accompanying illustrations, Fig. 7 to 10 inclusive. This line of ball bearings is manufactured by the American Ball Co., of Providence, R. I., under the Reid patents.

Employes' Tribute to the Late B. F. Jones.

At a meeting of employes representing the allied interests of the Jones & Laughlin Steel Co., held at Pittsburg on May 19, the following preamble and resolutions were unanimously adopted:

WHEREAS, We learn with unmingled sorrow and regret of the death of our esteemed employer, Benjamin Franklin Jones, and

WHEREAS, His uprightness of character and fair and honorable treatment in all his business relations, as well as his courtesy and kindly interest in those who were associated with him have endeared him to us all, and

WHEREAS, We recognize that most of the success of the great business enterprise with which we are all identified has largely been the result of his wise counsel and untiring efforts, and

WHEREAS, His public life and character has always been such as to commend itself most highly to all classes of people; therefore, be it

Resolved, That we herewith place on record our high appreciation of his sterling qualities, and believe them to be worthy of emulation. And further

Resolved, That we extend to his sorrowing widow and family our sincere and heartfelt sympathy, and commend them to Almighty God as the source of all true consolation, hoping that He may alleviate their grief in this their great bereavement.

Resolved, That we also extend our sympathy and expression of unfeigned regret to the members of the Jones & Laughlin Steel Co.

Resolved, That these resolutions be published in the daily and trade papers, and that a copy of the same be presented to the family and to the company.

The British Westinghouse Electric & Mfg. Co., Ltd., outbids German and Austrian manufacturers and wins another large municipal contract in England, the competition among manufacturers having been unusually keen. The London County Council closed a contract with the Westinghouse company, amounting to about $590,000, and calling for 200 tram cars which are to be used on its lines south of the Thames. This is the largest order ever given for electric cars in England.

The Republic Iron & Steel Co. has declared the regular quarterly dividend of 1¼ percent on the preferred stock, payable July 1st.

The Pennsylvania Railroad Co. has purchased from the Ball Engine Co., Erie, Pa., for its Altoona shops, a 450-h. p. tandem compound engine, direct connected to General Electric alternator. This engine is the fifth of this size purchased within two years from the Ball Engine Co.

Cincinnati Machinery Market.

CINCINNATI, June 1.—Conditions in the machinery trade continue satisfactory. While the volume of business was not quite so large, in the way of new orders, as the average of the preceding four months, the falling off has not been important and is only noticeable in a few instances, or is confined to only a few shops. There has been no change in prices and we hear of nothing pending which would tend to lower prices; but on the contrary higher cost of manufacture is the burden of comment, which is rather more in the direction of a rigid maintenance of prices or an advance. It may be pointed out that the cost of fuel has advanced and new contracts are showing prices for steam coal 50 percent and more above last year's prices on expiring contracts. The reduction in working hours in Cincinnati shops from 57 to 55 hours per week has increased the cost of labor. An advance in screws and nuts is reported. These factors, together with the increasing demands of labor, are elements of strength so far as prices are concerned. It is also noticeable that the shops are all busy without accumulating any stock and orders are in hand for all machines under construction. Some business has been lost because of inability to make immediate delivery.

The work of enlarging plants and making additions and rebuilding is being prosecuted as actively as heretofore and all through the machinery district the activity and enterprise displayed gives evidence of prosperity.

The Cincinnati Machine Tool Co. has bought a new site at the corner of Spring Grove Ave. and Township St., 200x150 feet, and will erect thereon a three-story building. The plans are now under way and ground will be broken by July 1. This new shop building will give the company a much larger plant and will necessitate considerable addition to the tool requirements and a new power plant. The company reports orders heavy and business excellent.

The Cincinnati Planer Co. will place orders this week for a new 150-h. p. Corliss engine and a 100-k. w. generator. The company is arranging to drive all its departments by motor and expects to have the new equipment all installed and in operation by Sept. 1.

The Dreses Machine Tool Co., of Cincinnati, has secured a large contract for machine tools to be installed in the United States Naval Station at Cavite, Philippine Islands. Orders have also been taken lately for tools to be exported to Sweden, Denmark and Italy.

The Cincinnati Milling Machine Co. reports orders holding in volume to the high record of the preceding four months and notices an increase in the foreign trade the past month. Work has commenced on the company's new shop addition. It has placed an order with the Warner Elevator Co., of this city, for one of its largest electric elevators.

The Lodge & Shipley Machine Tool Co. has enlarged its stock room and installed some new machines. The company has completed a large number of machines the past month and is running as heavy as possible to keep up with orders.

The John Steptoe Shaper Co. has had a good month's business. Many pending orders have come in. Two large shapers went to Spain this week. Inquiries from railroad shops were good, and two orders from the Pennsylvania Railroad were received.

The Rahn-Mayer-Carpenter Co. says that the demand continues heavy and includes an occasional foreign order. The company has now completed its new warehouse and even with these added facilities finds it difficult to keep up with demands of buyers.

Greaves, Klusman & Co. continue to receive a good line of scattered orders and are still busy.

The strike of the pattern makers, who have been out for thirteen weeks, has been ended and the men went back to work on May 29. The strike began last January with a demand for shorter hours and increased pay. One of the shops conceded the demand but the balance rejected them. Since then the strike or lockout has been carried on. Walter Laidlaw, president of the Cincinnati Metal Trades Association, on behalf of the firms in that association, offered as a compromise to reduce the working hours of the pattern makers from 57 per week to 55 hours, without any reduction in the pay received before the strike, if they would declare the strike off and return to work. The pattern makers decided to accept this arrangement. This is the same arrangement which was voluntarily granted to other employes.

The last quarterly dinner of the Cincinnati Metal Trades Association, at the Business Men's Club, was a notable one. The association had as its guests the twenty-five manufacturers from all over the country, chiefly district committeemen of the National Metal Trades Association, who were in this city to study the Cincinnati methods of dealing with labor. There were present at this dinner the superintendents and foremen of the firms members of the association. Plates were laid for 150 persons. The occasion was a most interesting one. H. M. Norris, of the Bickford Drill & Tool Co., read a paper showing some remarkable results in fast turning obtained on an 18-inch lathe, specially arranged for such high speeds necessary as fully utilize the rapid cutting qualities of Novo steel. Another paper by William Lodge, of the Lodge & Shipley Co., on the "Ideal Foreman," was much appreciated. There was a very happy response to this paper by Mr. Baker, foreman of one of the Cincinnati shops.

The visitors were delighted at the feature of inviting the superintendents and foremen to sit down with the proprietors at a dinner of this character. It was something new to most of them and the plan will no doubt be inaugurated in other places.

The aggressive and enterprising spirit of the machine tool men of this city is again attested by the preparations being made to attend the convention of the National Machine Tool Builders' Association, at Worcester, Mass., on June 9. Fred A. Geier, of the Cincinnati Milling Machine Co., is obtaining the names of those who are to go and is making most of the arrangements. There promises to be a large delegation and a special car has been arranged for. The subjects to be taken up are not yet given out, but it has been said that a paper on "The Apprenticeship System" will be presented by Mr. Viall, of the Brown & Sharpe Mfg. Co. The list of those who have signified their intention of attending this meeting is as follows: R. K. LeBlond, of the R. K. LeBlond Machine Tool Co.; Jos. Wolf, of the Hisey-Wolf Machine Co.; W. H. Burtner, of the Cincinnati Planer Co.; H. C. Hoefinghoff, of the Bickford Drill & Tool Co.; W. A. Greaves, of Greaves, Klusman & Co.; J. B. Doan, of the American Tool Works Co.; A. H. Tuechter, of the Cincinnati Machine Tool Co.; Geo. F. Stewart, of the Bradford Machine Tool Co.; William Lodge, of the Lodge & Shipley Machine Tool Co.; C. F. Mayer, of the Rahn-Mayer-Carpenter Co.; Philip C. Fosdick, of the Fosdick Machine Tool Co.; E. A. Schumacher, of Schumacher & Boye, and Fred A. Geier, of the Cincinnati Milling Machine Co.

The Globe Machine & Stamping Co. has just added 4,500 more square feet to its factory and has installed the following new machinery: A Cincinnati back-geared shaper, Cincinnati drill press, Bardons & Oliver screw machine, Knecht drill press, St. Louis tapping machine, Prentiss engine lathe, Burnham engine lathe, Villiard & Oswald punching press, Chicago Flexible Shaft Co.'s gas hardening furnace, etc. In the die shops, the company is executing recent large orders for drop forging dies, dies for the steel tops and other parts for gas ranges, dies for producing steel hot air registers in ornamental embossed design, together with a large number of minor orders in this line of work. In the manufacturing department, the company is manufacturing to order a varied line of work, including several hundred bicycle repair jacks with universal vises, each machine weighing about 125 pounds; also adjustable oval and circle cutting machines, which cut all sizes of circles and ovals in paper and card board; smaller articles, such as pressed steel drawer handles, potato peelers, various styles of sash locks, screen door locks, gate locks, typewriter copy holders, etc. It also reports recent sales of its improved oblique tumbling barrels to the Western Electric Co., of Chicago; American Waltham Watch Co., of Waltham, Mass.; Cleveland Wire Spring Co., of Cleveland; Griswold Mfg. Co., of Erie, Pa.; S. F. Bowser Co., of Fort Wayne, Ind.; St. Louis Screw Co., of St. Louis, and others.

The Rust Water Tube Boiler Co., Pittsburg, is seeking a site for the erection of a new plant.

U. S. SHIPBUILDING CO. REORGANIZATION.

The plan for the reorganization of the United States Shipbuilding Co. provides for a company with the title of the Bethlehem Steel & Shipbuilding Co. The properties to be taken over are: Union Iron Works, San Francisco; Bath Iron Works, Ltd., Bath, Me.; Hyde Windlass Co., Bath, Me.; Crescent Ship Yard Co., Elizabethport, N. J.; Canda Mfg. Co., Carteret, N. J.; Samuel L. Moore & Sons Co., Elizabethport, N. J.; Eastern Shipbuilding Co., New London, Ct.; Harlan & Hollingsworth Co., Wilmington, Del.; also all of the capital stock (except directors' qualification shares) of the Bethlehem Steel Co., owning the Bethlehem Steel Works. It is proposed that the new company in the acquisition of all the properties and assets of the above companies and for securing additional cash working capital shall issue $12,000,000 of 30-year 5 per cent first mortgage gold bonds.

There will be issued voting trust certificates for $16,000,000 of 7 percent noncumulative preferred stock. This stock is preferred as to assets, as well as to dividends. Voting trust certificates will be issued for $15,000,000 of common stock.

The holders of the present 5 percent collateral and mortgage bonds of the company are to receive all of the $12,000,000 of new bonds. The total capitalization of the new company will be $43,000,000. The initial voting trustees will be Charles M. Schwab, George R. Sheldon, Max Pam, Charles W. Etmore and James H. Reed of Pittsburg. The plan has already been approved by the holders of large amounts of the various securities.

The plan practically cuts the present capitalization in half, and also reduces by about one-half the fixed charges, exclusive of the interest on the underlying bonds of the Bethlehem Steel Co. and the Bethlehem Iron Co., and provides $2,000,000 additional cash capital. The necessity for the reorganization is set forth at the beginning of the circular letter issued to the holders of the Shipbuilding Co.'s bonds and stocks by the reorganization committee, who say: "By reason of the excessive mortgage obligations of the United States Shipbuilding Co., its borrowing capacity and credit have become so seriously affected that outstanding notes are being pressed for payment, and the making of further loans is rendered impossible. * * * The United States Shipbuilding Co. has been compelled, from its organization, to make advances, from time to time, to its constituent companies, for working capital and cost of operation, of most of the available cash in hand. The reduction of the working capital thus disclosed and the impracticability of drawing upon the resources of the shipbuilding plants, have resulted in a material impairment of the cash assets of the United States Shipbuilding Co. The company will be unable, on July 1, 1903, to meet the interest or sinking fund accruing on its first mortgage 30-year bonds."

Included in the circular to the holders of United States Shipbuilding securities are letters from the president of the Bethlehem Steel Co. and the treasurer of the United States Shipbuilding Co., who estimate that the earnings of their companies for the year beginning May 1, 1903, will be respectively $2,767,550 (including $517,550 of earnings applicable to underlying bond interest) and $750,000. In its application to the New York Stock Exchange the United States Shipbuilding Co. gave its earnings for the 3 months ending Nov. 30, 1902, as $554,021.45; in the letter of the treasurer the earnings for this period are stated as $474,906.85.

Charles G. Smith Co., 347 Fifth Ave., Pittsburg, is now representing the Bullard Machine Tool Co., of Bridgeport, Conn., on a line of boring mills, turret machines, etc. The same company also represents P. Blaisdell & Co., of Worcester, Mass., on a line of drill presses. These, in addition to the other houses it has been representing, give the Pittsburg company a pretty complete line of machine tools.

The Alabama Steel & Wire Co.'s rod mill and wire and wire nail mills at Ensley, Ala., will be closed down for repairs in midsummer, but there is no intention, as some misinformed reports have said, to remove this great plant to Gadsden. The steel plant at Gadsden will be in operation by the end of the year, and the first blast furnace by fall.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Steel & Wire Co., Philadelphia, Pa., has been incorporated with a capital of $200,000.

The Cereal Machinery Co., Ltd, with a capital of $500,000, and principal office at Windsor, Ont., has been incorporated. Incorporators are F. A. Wagner, J. D. Bourdeau and Mary E. Emmons, all of Detroit; E. C. Kenning and E. A. Cleary, of Windsor, Ont.

The Globe Power Co., of Buffalo, with a capital of $200,000, has been incorporated to manufacture machinery. The directors are: E. E. Hoover, W. M. Hoffman and G. H. Hoover, of Buffalo.

The Cutler Nail Co. has been organized at Kittery, Maine, to deal in nails and machinery. Capital stock is $5,000. The promoters are: Herbert H. Pratt, Swampscott, Mass.; James W. Smith, Solomon W. Cutler, Lynn, Mass.; A. M. Meloon, Newcastle, N. H.; Horace Mitchell, M. G. Mitchell, Kittery.

The Pacific Steel & Wire Co., of Portland, Me., has voted to increase its capital stock from $250,000 to $500,000.

The Bell-Donnelly Mfg. & Supply Co., Fairfield, Me., has been incorporated with a capital of $10,000 to do a general foundry and machine business.

The Holton & Weatherwax Co., Jackson, Mich., has been incorporated with a capital of $75,000 to manufacture and sell foundry supplies, machinery, tools, etc.

The Racine Engine & Iron Works, Racine, Wis., capital $100,000, has been incorporated.

The Steel & Iron Fuel Co., Fairmont, W. Va., has been incorporated to operate coal lands; to deal in machinery and to manufacture fire clay and red brick. Capital, $300,000

The Erie Forge Co., Erie, Pa., capital $150,000, has been incorporated.

The Mutscher Machine Co., Rochester, N. Y., has been incorporated to manufacture and deal in machines, which shall prepare, write, print and emboss bank checks and drafts, and like instruments, for the payment of money. Capital stock, $100,000.

The Union Forge Co., Pittsburg, has been incorporated with $50,000 capital, to manufacture rivets, bolts and forging. The plant will be erected and will be in operation in August. Equipment has been purchased.

The Cast Steel Wheel Co., Chicago, has increased its capital from $2,500 to $500,000.

The Brock Engineering Works, Chicago, has been incorporated with a capital of $60,000 to operate a machine and foundry works.

The Triner Scale & Mfg. Co., Chicago, has been incorporated to manufacture tools, dies and machinery. Capital, $20,000.

The Angola Furnace Co., Angola, Ind., capital $20,000, has been incorporated.

The Beam Coke Oven Steam Boiler Co., Punxsutawney, Pa., has been incorporated to manufacture an apparatus to utilize heat from coke opens for generating electricity.

The Syracuse Forge & Stamping Co., Syracuse, N. Y., capital $25,000, has been incorporated to manufacture sheet metal.

The Lafayette Fence & Machine Co., Lafayette, Ind., has been incorporated to manufacture fences and machinery.

The Youngstown Wire & Iron Co., has been organized at Youngstown, O., to manufacture light iron and wire works. The officials of the company are: G. D. Clifford, president; T. H. Hyde, manager; J. H. Wagner, secretary and treasurer.

The Interstate Steel Co., Pittsburg, has been incorporated, with a capital of $10,000. The directors are: L. W. Hicks, Leechburg; H. E. Sheldon, R. D. Campbell, Pittsburg.

The Southern Structural Steel Co., San Antonio, Tex., recently organized, expects to equip a plant with suitable machinery for the manufacture of steel jail work, and hopes to be ready to begin operation in the next thirty to sixty days.

The Youngstown Wire & Iron Co., Youngstown, O., capital $10,000, has been incorporated by Geo. D. Clifford, Thomas H.

Hyde, J. H. Wanger, John J. O'Neill and Pattrick J. O'Neill.

The W. J. Sly Mfg. Co., Cleveland, capital $25,000, has been incorporated by W. J. Sly, W. C. Sly, W. C. Bruce, Sidney Vessy, and H. D. Davis. Foundry appliances, etc.

Fires and Accidents:—

Fire which destroyed the machine shops, round houses, warehouses and minor buildings of the Seaboard Air Line Railway, May 23d, entailed a loss of about $100,000; partially covered by insurance.

Fire destroyed the broom factory and machine shops of Dale & Reed, Franklin, Pa., May 23d. Loss $8,000.

The Old Colony Foundry & Machine Shop, East Bridgewater, Mass., was destroyed by fire May 21st. Loss $10,000.

Recent heavy storms resulted in the destruction of two plants. On May 26 in Chicago, a foundry building belonging to The Pettibone-Mulliken Co., collapsed. The wind had a velocity of seventy-two miles an hour. The building was a steel structure and officials of the company are of the opinion that it was struck by lightning, as they do not believe the wind alone could have brought about the destruction. In a recent wind storm at Los Angeles, Cal., the new boiler shop of the Pioneer Boiler & Machine Works, collapsed. The building was 75 x 50 feet and had just been completed. The shop evidently was stoutly built, as it was set upon cement piers and held together by girders measuring 8 x 8 inches.

The old Taylor Wire Nail Co.'s buildings, Greensburg, Pa., occupied as a foundry by A. H. Lang, of Pittsburg, were destroyed by fire, causing a loss of $20,000, with small insurance. Loss on stock and equipment, $6,000.

Fire on the afternoon of May 31st swept over the manufacturing district in the southern part of Racine, Wis., doing damage to the amount of about $300,000. Among the companies damaged were: Racine Boat Mfg. Co., $115,000; J. I. Case Threshing Machine shops, $150,000; Standard Oil Co., tanks and sheds, $25,500; J. I. Case Plow Co., $5,000.

A severe wind and rain storm in Kokomo, Ind., May 28th, did extensive damage. Among the concerns which suffered were the Kokomo Steel Works and the Ford Donnelly Iron Works.

Fire of unknown origin damaged the stock and building of the Keystone Shovel Works, Philadelphia, May 27th, to the extent of about $20,000.

The plant of the Perkins Machine Co., South Boston, Mass., was damaged by fire May 29th. Fortunately no patterns were destroyed, and the damage to the foundry will not cause any delay in the shipment of orders, or orders which may come in from day to day, as the company is running two foundries in order to make prompt shipments.

New Construction:—

Extensive improvements will be made by the Crucible Steel Co. of America in completely modernizing its Howe-Brown plant, on Liberty Ave., Pittsburg, unless negotiations for the sale of the real estate to the Pennsylvania Railroad are completed within the next few months. The directors have been delaying the work on the Howe-Brown plant because of the possibility of purchase by the railroad, but it is not now expected that the transfer will be made.

An additional building for foundry use will soon be erected by the Phœnix Iron Works, Meadville, Pa.

J. C. Robinson is contemplating the erection of a foundry in Spokane, Washington.

Bids have been received for a one-story brick foundry, 80 x 151 feet, which will be built for the Ajax Metal Co., Philadelphia.

The Hyle Bros.' Steel Tool Co., Syracuse, N. Y., has purchased a site of three acres on which the new steel plant will be built. The cost of the site, buildings and equipment will aggregate about $75,000.

Albert Ritty, of Dayton, O., has purchased a site in Miami, Florida, and will erect a machine shop 40x25 feet. The machinery has been purchased.

Larsen, Carpenter & Co., Hallock, Mich., have commenced the erection of a machinery exhibit hall, 58 x 100 feet.

The plant of the Waterous Engine Works, St. Paul, Minn., recently destroyed by fire, will be rebuilt on the old site. A temporary structure will be erected at once. The company manufactures gasoline engines.

The contract for the erection of the Charleston Stove Foundry, at Mattoon, Ill., has been let, and the work will be pushed so that it will be finished prior to the time specified, December 10. This company recently moved from Charleston, Ill., to Mattoon.

The Columbian Stamping & Enameling Works, Terre Haute, Ind., has let the contract for the erection of a large warehouse. The dimensions will be 97 x 64 feet, four stories.

The J. H. Gillon Machine Co., Waycrosse, Ga., has completed the establishment of its foundry and machine shops.

C. O. & F. A. Porter, machinists, Grand Rapids, Mich., are having plans prepared for a two story addition to their shop. The building will be 28 x 44 feet, and will cost about $4,000.

The latest addition to the plant of the Eagle Lock Co., Terryville, Conn., has just been completed, at a cost of $75,000. It is a five-story building, 50x250 feet, with a floor space of 184,000 square feet. The company employs about 300 men, and is very prosperous.

The Macgowan & Finnigan Foundry & Machine Co., St. Louis, Mo., has erected a foundry and shops, and will manufacture harrows, the Newton pulverizer and roller and the House coal fire setter.

T. Abbot & Son, proprietors of the Terrell Iron Works, Terrell, Texas, will rebuild the plant recently destroyed by fire. The foundry building will be 65 x 80 feet and will be equipped with a 5-ton traveling crane, 6-ton cupola and other modern foundry equipment. The machine shop will be 40 x 60 feet, fully equipped with machinery for doing general jobbing work. The pattern shop will be 60 x 30 feet.

Announcement has been made to the employes of the Dewees Wood sheet mill, McKeesport, Pa., that within a short time improvements will be started, which will cost about $50,000. Some of the old buildings that have been in use for the past 30 years are to be torn down and new ones erected in their place. New machinery will be installed in the various departments.

The Central Iron & Steel Co., Harrisburg, Pa., will rebuild at once the mills recently destroyed by fire. The new structure will be of steel, with iron roof, and perfectly fire proof. The company will not change in any way the character of the machinery or the arangement of these mills, as they were completely overhauled and modernized about three years ago.

The Southern Railway is preparing to make extensive improvement to its shops at Atlanta, Ga., including a boiler shop to be erected, and an addition to the machine shops.

The Westinghouse Electric & Manufacturing Co. is building an extensive addition to its Newark works, where integrating waltmeters and other recording equipment are manufactured. This factory is particularly well equipped, and the extension now being made will practically double its size and output. The company manufactures its own meter tools, jewels and special appliances.

The Toledo Machine & Tool Co., of Toledo, O., has just let the contract for a new shop building, which will be 100 x 262 feet. A portion of this building will be five stories, the balance two stories. The managers of the company have visited many of the best shops in the country for the purpose of getting full information concerning modern machine shop methods. The new shop will have a 30-ton, 40-foot span, electric traveling crane, with a 150-foot runway. Orders have been placed for a large amount of new equipment. Industrial railways, pneumatic hoists, and overhead trolleys are some of the features to which special attention has been given. The contractors are under bond to have the new building completed by July 25. A large portion of the new equipment is now on cars at Toledo, and the company expect to be doing business in the new quarters by August 15, when the present capacity will be more than trebled. It is possible that the capital stock of the company will shortly be increased to $250,000.

General Industrial Notes:—

The Dover Forge & Iron Co., Canal Dover, O., whose incorporation was recently noted, has elected the following directors: Ambrose Beard, F. H. Waldron, A. Weiss, H. W. Enck, James Rees, L. P. Wentz, C. F. Baker. The officers

named by the directors are: A. Weiss, president; H. W. Fuck, vice president; Ambrose Beard, secretary, and Charles F. Baker, treasurer.

The Bethlehem Steel Co., of Bethlehem, Pa., last week turned over to the Lehigh Valley Railroad Co., for shipment to the Carnegie plant, at Homestead, Pa., a railroad car on 32 wheels, 103 feet long, carrying two steel castings weighing 227,000 pounds. The castings are said to be the largest single shipment of the kind ever made.

Newport Rolling Mill, Newport, Ky., has resumed operations, after being idle for two weeks owing to a lack of steel billets and bars.

The Massillon Bridge Co., Massillon, O., which is considering the advisability of moving from that city on account of not being able to buy land adjoining its plant, has received propositions from a large number of cities from San Francisco to New York. A very liberal proposition has been made by the Board of Trade, of Mansfield, O., and that city may succeed in getting the plant.

It is announced that the United Steel Co., Canton, O., will be prepared to turn out sheets and billets within three months. The open-hearth department will occupy a building 260 x 90 feet, while the blooming mill will be 360 x 40 feet.

Extensive improvements are being made to No. 6 blast furnace by the Cambria Steel Co., Johnstown, Pa., and the stack has been almost entirely reconstructed. The new furnace will have a capacity of 400 tons per day; the old furnace had a capacity of 275 tons.

The Port Huron Air Tool Co., Port Huron, Mich., has filed a chattel mortgage of $44,000 to Nathan Thompson, trustee, for creditors. One of the stockholders says that the financial embarrassment is the result of mismanagement at the time of the establishment of the company when goods that could not be sold were manufactured. Arrangements have been made for a continuance of the business, and the goods will be manufactured by the Lee Injector Works.

Machinery is to be installed at the Birmingham rolling mills of the Republic Iron & Steel Co., for the manufacture of railroad spikes.

The Wilks Foundry Co., Toledo, O., has just cast two large cylinders for the battleship Nebraska. The larger one weighs 17 tons. This foundry is also about to ship a large bedplate for a Milwaukee concern, this plate also weighing 17 tons.

Soft center steel for agricultural implements is now being made at the plant of the Norwalk Steel & Iron Co., Norwalk, O., and will be one of the principal products of the mill.

The Franklin Rolling Mill & Foundry Co., Franklin, Pa., is now manufacturing various steel products in its new buildings, and when they are finished the company will begin the making of tripartite steel poles for use in construction of trolley, telephone and telegraph lines. The company will give employment to between 250 and 300 men.

The Excelsior Foundry Co., Bay City, Mich., is now doing a large business in casting iron columns for sugar plants erected by the Kilby Mfg. Co., Cleveland. The company has recently furnished the iron columns for five factories and is now working on material for three more plants.

The Crescent Forge & Shovel Co., Havana, Ill., has succeeded by purchase the shapes department of the business of the Havana Metal Wheel Co., having purchased the full complement of machinery, power plant, real estate, materials and manufactured goods. The company will manufacture fitted, bolted steel plowshares for the jobbing trade, and to order only. The company has patterns, dies and all necessary machinery for manufacturing over fifty different sizes and kinds of the leading makes of steel plowshares. The company will continue to manufacture the merchant shapes and such as are used by blacksmiths.

Concerning the reports that the Salisbury Wheel & Mfg. Co., Jamestown, N. Y., expects to move to another city, the company advises us that it does intend to move, but as yet has not decided upon its future location.

The last of 45 car loads of material, manufactured in Pittsburg, has been shipped to Seattle, Washington, where it will be loaded on a ship and taken to Nome, Alaska, for the building and equipping of one of the largest power and water plants in that section. The plant will be erected for the Nome Exploration Co., of which J. W. Kelly, an oil and gas operator, of Pittsburg, is president, and in which other Pittsburg men are interested. The company has a capital stock of $600,000, and its plant will furnish hydraulic power for the mines along the Nome river.

It is reported that a large body of iron ore has been discovered, found at a depth of 550 feet, in what is known as the Bonair property, near Leadville, Col. The manager says the mine will produce 150 tons daily.

The recent purchase of 1,080 acres by R. H. Sayre, from the Louisville & Nashville Railroad, in Jefferson County, Ala., is announced to have no connection with the Pittsburg & Southern Coal & Iron Co., and is part of a deal commenced some time ago by Mr. Sayre, who already owned considerable property in Jefferson County. The property recently purchased is about 20 miles from Birmingham, on the line of the new extension being constructed by the Louisville & Nashville Railroad. The property is said to contain valuable coal mines. It will be developed and coke ovens built.

As a result of negotiations, which have been on for some time, the Industrial Bureau, of Cincinnati, has succeeded in locating another new industry in that city. Thomas C. Kane, who has been engaged in manufacturing files, in Dayton, will move to Cincinnati, and, with George A. Lutz, of that city, will organize the Lutz-Kane File Co., and engage in the manufacture of files, in a building which has been leased, at 1108 and 1110 Harrison Avenue.

The Crucible Steel Co. of America has leased for a long term of years, a building, to be erected in New York city, on Canal, Varick, and Laight streets. The plot contains over 10,000 sq. ft. The building will be three or four stories high, of extra heavy construction, as the ground floor is to be used for the storage of steel. The upper stories will be used for the offices of the company. It is expected that the building will be ready for occupancy before Oct. 1.

The Jones & Laughlin Steel Co., Pittsburg, has been authorized to transact business in Illinois, using a capital of $386,000 in that State.

The manufacture of iron at the blast furnace in the State Penitentiary, at Rusk, Tex., has been resumed. About 500 convicts are to be employed in the manufacture of pig iron and iron pipe.

The recent fire at the plant of the Moore Bros. Co., consisting of a machine shop and foundry at Elizabeth, N. J., was of small consequence, as work was resumed the following day.

The Stamping & Tool Co., recently incorporated at La Crosse, Wis., will engage in metal stamping, die making, electro-plating, tool making, etc. The company will also take contracts for the manufacture of small metal novelties, etc. Its shop is well equipped. Contracts are coming in very satisfactorily. The company intends to be conservative and enlarge its plant as business may warrant. It has rented a building for three years and does not intend to build.

Geo. H. Bowler & Co., Cleveland, dealers in machinery, have leased the plant of the American Foundry & Machine Co., at Ravenna, O., and will operate it under their own name. The plant, which was recently built, consists of a foundry, 75x200 feet, and a machine shop, 80x150 feet. The foundry will be used for general jobbing work in heavy castings. The machine shop will be used for repairing and rebuilding machinery and for other work, the exact character of which has not yet been decided upon. Some new equipment will be installed in the plant.

A number of scrap iron dealers in Indiana have organized the Indiana Scrap Dealers' Association with the following officers: Abe Orenstein, Indianapolis, president; D. R. Cohen, Terre Haute, secretary; S. Finkelstein, Indianapolis, treasurer. It has been announced that the association "will fight the United States Steel Corporation," which, it charges with endeavoring to keep down the prices of scrap, but President Orenstein denies that this is the object of the new association.